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CENTRAL INTELLIGENCE AGENCY

SELECTED TRANSLATIONS FROM 'VOYENNAYA MYSL',

Issue No 7, July 1963

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Table of Contents

|   | <u>Page</u> |
|---|-------------|
| An Evaluation of the Results of the June Plenum<br>of the Central Committee of the Communist Party USSR | 1           |
| The Aims and Content of the Theory of Operations<br>Research  | 20          |
| The Factors of Space and Time in Military Operations  | 35          |
| Troop Combat Operations Under Condition of Radioactive<br>Contamination of Terrain                      | 48          |
| Naval Support of Ground Forces  | 62          |
| The Third Edition of "Marxism-Leninism on War and the<br>Army"  | 76          |

CPYRGHT

By Maj-Gen K. Bochkarev

Our Party holds high the victorious banner of creative Marxism-Leninism, staunchly and confidently leads the Soviet people toward the victory of Communism, and honorably justifies its role as the advance guard of the World Communist Movement. This was again forcefully demonstrated by the June plenum of the Central Committee, which took up the immediate tasks of the Party's ideological work. Guided by the decisions of the 22nd Congress, and shaping the Congress's requirements and directions as applied to the present situation, the Plenum worked out a comprehensive program for the Communist education of our nation, and defined ways to radically improve the ideological-educational activities of all the country's Party organizations. The documents of the Plenum are an outstanding contribution of our Party to the theory and practice of the building of Communism, a remarkable example of the creative development of Marxism-Leninism, and its defense from each and every dissenter in the World Communist Movement in the uncompromising struggle with corrupt bourgeois ideology.

The Soviet people, including the men of the Army and Navy, greeted the results of the Plenum's work with enthusiastic and unanimous approval; they are very attentively studying the passionate and deeply meaningful speech of N. S. KHRUSCHEV, which reveals the essence and meaning of the party's ideological work at the present time. They are also paying great heed to the detailed report of the Secretary of the Central Committee CPSU, L. F. ILICHER and to the decisions and all other documents of the Plenum. The work of the Plenum gained wide response in fraternal Marxist-Leninist parties and in the entire world community.

The conduct of the Plenum especially along ideological lines is a wholly logical extension of those measures lately taken by the party for the perfection of party and state control of the national economy. While improving the methods and forms for the management of economics, and mobilizing the energy of the nation for the execution of the main task, i.e. the creation of the material-technical base of Communism, the party has not for a moment lost sight of the questions of ideology and communist education.

The ideological front is the most important front in the building of Communism and its integral constituent part. The resolutions of the June Plenum are a new testimony that the Party cares about the spiritual growth of the Soviet people and about the ideological arming of all our cadres. "Our Plenum," said Comrade N.S. KHRUSCHEV,

"has given careful consideration to important questions. I think that the resolutions of the plenum will play a great part in the life of the Party and the country. The ideological weapon must always be in tip-top condition, always ready. With this weapon it is necessary to destroy the enemy who is trying to undermine our work. Our nation is closely united around its Communist Party. The Soviet people, under the leadership of the Party and under the banner of the Party, gain new victories, new accomplishments.

"Having raised high the banner of Marxism-Leninism, we shall, with even greater confidence, move more quickly toward our designated goal, which was set forth in the resolutions of the 22nd Congress and the Program of our Party -- towards the victory of Communism!"

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The June Plenum clearly demonstrates the ideological maturity and solidarity of our Party. In all of its works the CPSU is guided by Marxism-Leninism and firmly and correctly holds to Lenin's course. In this lies the inexhaustible source of our Party's strength, which was fostered by the great Lenin and to whose voice the entire world hearkens. "How many teeth the enemies of Socialism have broken in fighting our country!" said N. S. KHRUSCHEV at the Plenum. "They realized long ago that the main force which makes possible the proper management of all the work of the building of socialism and communism, that which gives it an organized, systematic character and revolutionary scope, that which supplies all the successes of this building, is the Party of Communists, its scientifically-based policy, and its revolutionary philosophy -- the Marxist-Leninist Theory."

The ideas of Marx, Engels, and Lenin have a real part in the affairs of our nation, which, under the direction of its advance guard, the Communist Party, confidently paves the way for a bright future for all of Mankind -- Communism. The most important result of the party's activities lies in the fact that socialism has gained a final and complete victory in our country. A man with Communist ideals and high moral principles is being raised; the ideology of millions of people for the first time in history is formed on the scientific basis of Marxism-Leninism, and the Soviet nation now possesses a scientifically-based plan for the building of Communism.

The Plenum of Central Committee CPSU has emphasised the meaning of the last decade, which in the true sense appears as a period of change in the history of the party and our entire nation. The future that was prophesied for our country in 1953 by the ideologies of imperialism is known to all. They amused themselves with the

hope that after Stalin's death everything would go wrong in the Soviet state, that it would take a long time for the Soviet Union to right itself after World War II, and that they would be able to impose their will on the Soviet Union. Life has frustrated the evil prophecies of the enemies of the USSR.

The party, having dispersed Stalin's personality cult, having recovered in full, and having developed Lenin's principles of Party and national life has given wide scope to the initiative and creativity of the people, and has brought about a truly unforeseen advance in the development of the economy and in the strengthening of the Soviet socialist state and its defense capability.

The time is not too distant when the Soviet nation will overtake the US economically and attain the highest standard of living in the world.

The past years were years of great improvements in the development of our industry, agriculture, science, and culture, of which the Soviet people are justifiably proud. The gross output of industry in the USSR almost trebled in the last decade, and the gross output of agriculture increased by 67 percent.

Our country has stepped into the leading positions of modern scientific and technical progress, which is strikingly evidenced by the wondrous achievements of the Soviets in the conquest of space. While the June Plenum was at work, the attention of the entire world was attracted to a new triumph for the Soviet Union -- the launch into outer space of the "Vostok 5" and "Vostok 6" space vehicles. Soviet people were at the controls of these remarkable crafts Valeriy Fedorovich Bykovskiy and the first woman cosmonaut, Valentina Vladimirovna Tereshkova. Their daring flight into space, like all previous exploits of Soviet cosmonauts, is a living embodiment of the titanic strength of our nation, a brilliant demonstration of the advantages of the Soviet socialist structure, and of the creativeness of Marxist-Leninist ideology.

The past decade was heralded by decisive successes in the strengthening of the defense of the USSR and the power of the Soviet Armed Forces. The most important result of the work of the Party was the creation in our country of nuclear missile weaponry. There is a firm foundation for the continuous development of new technology and armaments. The entire defense system of the country satisfies the requirements of modern warfare. The Soviet state, in answer to the threats of the imperialists, is confidently building up a military advantage over its probable foes.

Together with remarkable achievements in the development of

economics, science, and culture, the strengthening of the country's defense has made still more firm the moral-political solidarity of the Soviet society, the union of workers and peasants, and the friendship of the peoples of the USSR. Social democracy has blossomed anew.

The authority of the Soviet Union in international affairs has increased enormously, and the influence of its policies on world events has increased. The Soviet Union firmly holds in its hands the initiative in resolving the fundamental problems of the times, and is the acknowledged leader of all forces fighting for peace, democracy, and socialism against imperialist reactionism. The resolution of the June Plenum said that, "the decisive successes of the Soviet nation in the building of Communism and the accomplishments of all peoples of socialist countries have created a qualitatively new balance of class forces in the world arena, wherein imperialism can no longer crush socialism militarily, and is suffering one defeat after another in the economic competition between the two systems."

Now, that the balance of power has shifted and continues to shift in favor of socialism, the confidence of the imperialists in the impunity of their military adventures has crumbled, and their hopes for success in economic competition are being destroyed, it is no wonder that they are counting on the poisonous weapon of bourgeois ideology. The enemies of Communism, especially the imperialists of the US -- that center of reactionism and obscurantism -- have created a gigantic propaganda apparatus, the efforts of which are directed at the complete whitewashing and embellishment of the Capitalist world and the simultaneous blackening of socialism and communism, at the sowing of seeds of dissention in the minds of the builders of the new society, and the undermining of the authority and prestige of the Socialist states and their solidarity.

Imperialist ideologists and politicians in no way reject military or other forms of battle; they try to carry the "war of ideas" directly into socialist countries and to propagate in them false conceptions: the "non-Party character of art"; "the conflict of generations"; "the absolute freedom of creativity", etc. In other words, they want to gain freedom for bourgeois ideology in socialist countries, to impair their moral-political potential, and undermine the guiding role of Communist Parties. This insidious scheme is a Trojan horse tactic. Our Party by nature rejects the rotten idea of peaceful co-existence of ideologies and responds to the intrigues of its enemies with increased vigilance and decisive attack on all fronts against the peddlers and preachers of anti-Communism and the libelers who are attempting to discredit our

nation, our social structure, and the ideology and policy of Lenin's Party.

The role of our party as the standard bearer of the great ideas of Marx, Engels, and Lenin has become more apparent in the last ten years. The theoretical work of the party, having been freed from the fetters of Stalin's personality cult, has become especially fruitful, and has found its most complete expression in the historical decisions of the 22nd Congress, and in the new program of the CPSU.

Our Party has performed a great service in that it has creatively adapted Marxism-Leninism to contemporary reality and given answers to all the vital problems of our time.

The Party posed and solved the fundamental questions about the transition from socialism to communism with exceptional depth, theoretically analyzed the process of the transformation of a state of the dictatorship of the proletariat into a total socialist peoples state. In cooperation with other communist and workers' parties, the CPSU worked out scientifically-based views on such important questions as the evaluation of the essence and peculiarities of the present epoch, the role of the world system of socialism and its influence on the whole course of international events, a definition of the peculiarities in the present stage of development of the capitalistic system, ways to victory for the socialist revolution and the conquest of the dictatorship of the proletariat in capitalistic countries, the unification of the forces of socialism, the national liberation movement, etc.

A creative solution to the problem of war and peace has great significance, i.e. the conclusion that world war has ceased to be a fatal inevitability, that it is possible to forestall it, and, in certain circumstances, exclude it from human society even though capitalism is preserved in part of the world.

The party has completely learned the meaning of the revolution that has taken place in military affairs, has deeply probed its significance and precisely determined the method of defending the socialist fatherland and the direction of military construction in modern conditions. The views of the Party on these vitally important questions compose the principal base of Soviet military doctrine.

While enriching the science of Marxism-Leninism with new deductions and conclusions, the Party protects the purity of revolutionary theory, decisively fighting various manifestations of opportunism, revisionism, and dogmatism. The Party does not lack forces for



the strengthening of the unity and solidarity of fraternal parties on the basis of the ideas of Marxism-Leninism, and is a model of fidelity to proletarian internationalism.

The June Plenum clearly demonstrates the firmness and consistency of our party in the defense of the revolutionary principles of Marxism-Leninism and communist ideology, which in the graphic expression of N. S. KHRUSCHEV, like cement unites the will and action of millions into one monolith of party and nation.

In its resolution "concerning the coming meeting of representatives of the Central Committee CPSU with representatives of the Central Committee CPC (Chinese Communist Party), the Plenum directed the Presidium of the Central Committee CPSU to follow without deviation the line adopted by the 20th, 21st, and 22d Congresses; to insist on the general course of the world communist movement expressed in the Declaration and Statement of the Moscow Convocation of Marxist-Leninist Parties. The Central Committee CPSU declared that in the future it will strive, on the basis of the principles of Marxism-Leninism and socialist internationalism, for the strengthening of fraternal friendship between the great peoples of the Soviet Union and the Chinese People's Republic, between the CPSU and the CPC, and also between other fraternal parties in the interests of the unity of the international communist and workers' movement, in the interests of the struggle for the common goal, i.e. the triumph of communism.

Previous plenums of the central committees of the parties of the union republics and of party committees, meetings of the most active members of the Party organizations in the Krays and Oblasts and in the Armed Forces of our country unanimously approved the decisions of the June Plenum, the political work of the Presidium of the Central Committee CPSU, and First Secretary of the Central Committee, CPSU, Chairman of the Council of Ministers of the USSR, Comrade N. S. Khrushchev, for the further unity of the forces of the world communist movement. All organizations of our Party categorically reject as unproductive and slanderous the attacks of the Central Committee CPC on the CPSU and other communist parties, on the historical decisions of the 20th, 21st, and 22d Congresses, and on the program of the CPSU which was worked out on the basis of Marxist-Leninist theory and practical experience in socialist building in the USSR and the experience of the international revolutionary movement.

Directing the building of a new society, the Party gives unflagging attention to the ideological arming of the people. Now, when the Soviet nation is accomplishing the extensive building of Communism and the revolutionary and national liberation movement

overseas has acquired unprecedented large dimensions, and when the battle of bourgeois and communist ideologies has become extremely acute, a new plateau has been reached in the ideological work of the Party. Never before in the field of ideology have problems so grandiose in size and profound in content arisen before the Party. Most important in the ideological-educational work of the Party at present is to secure ideologically the realization of the program of the CPSU, the victory of the ideals of communism, to reach the point where every worker, and in particular every Communist, has assimilated the goals formulated in it and is actively struggling for its practical realization.

In recent years much has been done to improve ideological work among the masses. The Leninist principles of this work have been established and decisive measures have been taken to overcome the harmful consequences of Stalin's personality cult which created dogmatism and overassiduousness, cliché and formalism in the educational work of party organizations. The party has reconstructed ideological work in accordance with the requirements of reality and the real problems of communist building.

The June Plenum comprehensively analyzed the experience of ideological work and revealed its faults. Strictly guided by the decisions of the 22d Congress and continuing its line, the Plenum precisely determined the basic policies and missions of ideological-educational work, upon which first of all must be concentrated the efforts of the party and all of our organizations. These policies include the formulation of a communist ideology for the workers, the overcoming of remnants of the past in the people's consciousness and behavior, the practical indoctrination of the active and class-conscious builders of Communism, raising the overall education and cultural level of the people, the indoctrination of the people in the spirit of Soviet patriotism and socialist internationalism, and incisive fighting against anticommunism and all forms of bourgeois ideology.

The decisions of the June Plenum apply to all participants in the building of communism. Their significance is also exceedingly great for Army and Navy party organizations, for the entire life and work of our armed forces. Clear and precise orders for Communists of the Armed Forces and all soldiers, the fulfillment of which will enable the combat readiness and might of the Soviet Army to be enhanced still further were emphasized in the proceedings of the Plenum.

The decisions of the Plenum of the Central Committee demands from us first of all that we realize and understand the great significance of ideological-indoctrinational work, its increased role

under present conditions, and the necessity of a fundamental improvement in all matters of communist education for members of the Armed Forces as a primary condition for the successful resolution of the crucial problems set before us.

Ideological work, like organizational work which is inseparably linked with it, is active work with people, with the main productive force of society, which is also the deciding factor in armed conflict. The essence of ideological work is the arming of people with a clear understanding of the goal, rationale, and meaning of their work; in other words, in the development of conscientiousness and in the formulation of a communist ideology. In combination with the school of life and work it is able to exert and does exert a very profound influence on every aspect of a person's behavior, on his spiritual make-up, will, and character. The formulative influence of ideological work depends directly on its ideological content. Marxist-Leninist ideas, a scientific world view, the noble, elevated goals of the building of communism and the defense of the Homeland against her enemies arouse in people great energy, initiative, creativity, and makes them fearless warriors able to conquer any difficulties.

Marxist-Leninist ideology is an entirely scientific ideology, comprehensively revealing the truth of life, calling people to heroic struggle with social injustice, wildness, barbarism, with the animalistic morals of the capitalistic order in order to maintain on earth the peace, work, freedom, equality, fraternity, and happiness of all peoples. The propaganda of the great ideas of Marxism-Leninism comprise the basis of the ideological work of the party, and this is the decisive source of its formulative influence of the development of Soviet society, on the life and work of the Army and Navy. Indoctrinating the Soviet people, the Party tries to ensure that they, having mastered Marxism-Leninism and learned the works of Marx, Engels, Lenin, the CPSU program, and the decisions of the party, thoroughly understand the course and perspectives of world social development, are correctly oriented in the situation, conscientiously build their lives in a communist way, and in all their behaviour follow the noble principles of the moral code of building communism.

The Soviet Army is strong in the class-consciousness of its personnel; questions of ideology, indoctrination, and the formulation of communist viewpoints and convictions have always had a leading place in its life. It is impossible not to see, however, that at the present time these questions have acquired special significance. Two main circumstances explain this. First, for general reasons relating to the development of the Soviet land as a whole. Our Armed Forces live one life with the people, and are

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communist Armed Forces. By their very nature they develop in the same direction as all of the social and governmental structure of the USSR. This means that the whole aggregate of ideological and indoctrinational tasks before the party and the Soviet government in this period of expansive building of communist society must find full solution also under the conditions of our military organization.

Second, the expanded role of ideological work in the Armed Forces is dictated by the specifics of the present stage in the development of military science, and by the nature of nuclear warfare. The revolution in military affairs and the fundamental changes in methods and forms of armed conflict have raised sharply the requirement for moral-political and moral-fighting qualities among the troops, for their steadfastness, fortitude, conscientiousness, patriotism, selflessness, for their ideological and moral training.

It is perfectly obvious that only persons strong in spirit can withstand the trials of modern war and achieve victory in it.

Our party completely takes into account the increased requirements for moral strength of the Army and Navy, is making greater efforts for its steady growth, combining this with energetic measures for providing troops with the latest technology and weaponry, and training in modern methods of armed conflict. The main goal of ideological work in the Army and Navy, as pointed out by Minister of Defense of the USSR, Marshall of the Soviet Union, R. Ya. Malinovsky, is: "to secure ideologically the realization of the missions assigned the Armed Forces by the 22d Congress and the program of the CPSU; to the further strengthening of battle readiness and battle ability of the Army and Navy, increased political vigilance and conscientious discipline of personnel; to indoctrinate the new man, an active builder of Communism, a heroic, ideologically convinced defender of the socialist Homeland; to carry out an decisive offensive against remnants of the past in the consciousness and behavior of members of the armed services and against bourgeois ideology; to unmask the aggressive, misanthropic essence of Imperialism."

Under the leadership of the Central Committee CPSU, an exceeding large amount of effort has been expended in the Armed Forces in a revision of the entire structure of the communist indoctrination of soldiers, the party political work in the forces, in overcoming the harmful aftereffects of the personality cult in matters of military organization. The decisions of the October Plenum (1957) of the CC CPSU had great significance for the Army and Navy, in that they re-established Lenin's principles of leadership by the military structure, as did the decisions of the 22d Congress and

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the new Program of the CPSU. As a result, as never before the Party influence was strengthened throughout the life and work of the armed forces.

In the Army and Navy, the rebuilding of party organizations has become a reality and their ranks have increased. At present in the overwhelming majority of companies, batteries, and flight wings there are Party organizations and groups. Along with this, the organization and material basis of ideological work has been firmly established, the system of training of personnel, its forms and methods is constantly being perfected. The participation of the fighting men in the study of party decisions and the bases of Marxist-Leninist teachings has greatly increased. In the armed forces hundreds of evening schools on Marxist-Leninist theory, Party schools, schools of culture and a considerable number of literary societies, amateur ensembles, orchestras, and theatres are functioning. In comparison with the pre-war years, the book funds of libraries has more than trebled. Our military press also has taken advantage of the great opportunities for ideological influence on the minds and hearts of the fighting men.

The ideological work in the Army and Navy has become richer in content and more varied in form. The ideological-theoretical capability of the officer corps and of all personnel has been increased. All of this has beneficially affected the lives and work of the troops, has contributed to the successful execution of the tasks assigned them. It would be, however, an inexcusable mistake to think that the new criteria and requirements on educational activities, which are dictated by contemporary conditions, have been realized completely to the end, that the ideological work fully meets the conditions which arise from the present stage of development of the Soviet state and of the revolution in military affairs. We still have, unfortunately, several weak areas, omissions in the education and organization of people, and it is namely here, and not in objective difficulties that lie the sources of these shortcomings in military training, in the behavior of individual soldiers, and in the organization of service, which are encountered in some units. These shortcomings are, as it were, living proof of flaws in our work with people.

Neither can it be said that the underestimation of ideological work has been fully overcome.

In a speech at the June Plenum of the Central Committee CPSU Comrade L. F. ILICHEV sharply criticized those leaders of businesses, kolkhozes, sovkhoses, and institutions who do not want to "bother" with the people, who utter the word "ideology" with difficulty, and then lightly toss about such expressions as "the plan at any price",

"who cares about ethics, since the point is the plan". For the Party, said L. F. ILICHEV, it does make a difference at what price the plan is fulfilled. Even a capitalist can organize production fairly well, but much more is needed from the Soviet leader -- not only to fulfill the plan, but also to educate the people, and form new relations between them.

Unfortunately, even in the Army, there are individual workers, who are thrallled by administration, shun living contact with the people, and substitute peremptory shouting and coarseness for conviction. "A different leader will come, let's say, into a company," says Mar SU Malinovsky, "and he sees everything -- what goes on in the barracks, the motor pool, the mess hall. There is only one thing he does not see: the man, the people, who by their own labor and sweat forge high combat readiness and create model order in everything."

The first important task of ideological work, as the June Plenum of the Central Committee CPSU pointed out, is the indoctrination of the toilers of our society in the spirit of soviet patriotism and internationalism, of love for the socialist Homeland and for the Communist Party of the Soviet Union, in the spirit of its glorious revolutionary traditions, the struggle with the remnants of capitalism in the people's minds.

The history of our people and the armed forces, our whole life reveals the widest scope for the indoctrination of workers, soldiers and sailors in the spirit of patriotism and internationalism. The Soviet people have borne much on their shoulders and undergone severe trials. Their amazing spiritual and moral characteristics have taken shape in the fierce battles with the enemies of the socialist Fatherland; they have found shining expression in heroic deeds on the labor front, creating a new society. The Soviet man loves his multinational homeland, his own people; he is proud of its achievements, and, at the same time, deeply respects other peoples and renders disinterested aid in the fight for freedom and independence. Conceit, bump-tiousness, boasting, and national arrogance are alien to him. Such is the moral make-up of our Armed Forces. However, in the large Soviet family, including the servicemen, there are still backward people burdened by the weight of old habits and morals, men in the street who are forgetting at what price the blessings were obtained which they wish to use, giving nothing to society, not cherishing the high title of Soviet citizen, Soviet soldier, or sailor.

"The Soviet people cannot understand those" -- as stated in the resolution of the Plenum -- "who are unworthy of being a Soviet citizen, who do not notice the gigantic accomplishments of the people, heroic in our lifetime, who are ready to cast slurs upon everything

dear to the workers, won by their sweat and blood, which constitutes our strength and glory." The indifference to politics, the lack of principles, the Philistine attitudes and views, no matter how rare they are, are completely intolerable in the Armed Forces, since directly or indirectly they are capable of doing damage to the cause of security of the Homeland.

The June Plenum with all clarity showed the increased importance of the task of overcoming the remnants of the past in the people's minds, the necessity for the intensification of the struggle against bourgeois ideology and the intrigues of the enemies of communism. As has already been said, in the conditions of present balance of power between the two systems, the imperialists to an ever greater extent are trying to utilize the method of ideological subversion in respect to the socialist states, and most of all against the Soviet Union. Actively devising all types of plans of "psychological" warfare, the ideologists of imperialism are taking special pains in order to defame the Soviet Armed Forces, their military growth, to falsify the history of the past war, to cast a shadow on the historical victories of our people in that war and at the same time to reach out its tentacles into our military might and plant in it its own agents.

The imperialists' calculations on ideological subversions are inevitably doomed to failure. However it would be criminal thoughtlessness to close one's eyes to the intrigues of the enemies of communism, to beguile oneself with the thought that the huge propaganda apparatus created by them is running idle. Even in our midst there are those individuals who are falling for the ruse of bourgeois propaganda. Being caught in its snare first of all are the office-seekers, the money-grubbers, the grabbers, the egoists, the various antisocial elements. Lacking social support in our society, the imperialists are staking their subversion mainly on the revival and support of the remnants of the past in the people's minds, upon those who have been burdened by their weight. The paltry small group of parasites, still existing in the family of Soviet peoples, is the last refuge of bourgeois morals and ideology on Soviet soil. A blow to the remnants of capitalism is a blow to bourgeois ideology.

We must answer the intrigues of communism's enemies with the increase of vigilance and decisive strengthening of the fight against bourgeois ideology. We must, with more sharpness and argumentation than is presently the case in a number of circumstances, unmask by lively facts and examples the anti-populist essence of the so-called "free world," and the aggressive and misanthropic nature of Imperialism. It is also impermissible to allow any liberalism regarding those who now start to sing in an alien voice, who hinder the strengthening of the battle readiness of the army and navy, who

flout our military laws, and communist norms of behavior. The business of overcoming the remnants is not a problem of the far-distant future, but an acute, vital problem which must be solved today using all means at our disposal.

Having debunked the slanderous fabrications of the anti-communist ideologists, we must reveal more clearly and convincingly the greatness and triumph of the ideas of Marxism-Leninism, its vast successes in the building of a new society, its unquestionable superiority over the corrupt capitalist system, which has outlived its time; we must also inculcate more actively and singlemindedly in our servicemen a noble feeling of pride in our fine Homeland and a burning hatred of all its enemies. More attention must be paid to propagandization of the great fighting traditions of the Soviet Army and Navy and the heroic exploits of our warriors in defense of the socialist Fatherland.

Soviet art and literature have an important place in the indoctrination of personnel in the spirit of Marxist-Leninist ideology, Soviet patriotism, and the requirements of the moral codex for building communism. In the speech of N. S. KHRUSHCHEV before the Plenum of the Central Committee CPSU, in his addresses at meetings with creative workers, we see clearly revealed the great indoctrinational value of literature and art, and an expression of the Party's concern for the flowering of the arts, and for the confirmation of Leninist ideas of party-mindedness and popular-mindedness through literature and art.

The formation of high moral qualities in Soviet soldiers presupposes an all-around development of a responsible attitude toward defending the homeland, a consciousness of the fact that the soldier's duty is the holy of holiest for a citizen of the Soviet government. It is obvious that such an attitude to the soldier's duty may take shape only under the condition that there is an understanding of the place and role of military service and the warrior's work in the life of the Soviet land, in the building of communism.

The main thing to recognize is that as long as imperialism exists, there remains the danger of war and armed attack on our homeland; that it is impossible to request peace from the imperialists, but only possible to dictate to them by force, by the inevitability of retaliation for aggression. This means that we are obliged to reckon constantly with the possibility that a nuclear world war may be unleashed; obliged to show unwavering vigilance in the search for the enemies of peace, and to do everything to strengthen the defensive capability of the country and the might of our Armed Forces. The Declaration of the June Plenum says that



from now on it is necessary to raise the all-around technical supply of materiel for the army and navy, and to perfect the combat prowess, ideological training, and readiness of soldiers to fulfill at any moment their sacred duty of defending the homeland. The Plenum emphasized further that Party, Komsomol, labor, and other social organizations should indoctrinate all Soviet people in the spirit of love and respect for the glorious Armed Forces of the Soviet Union, remembering that increasing the security of our country and the might of the Soviet Army and Navy is a vital responsibility of all of our people.

To put into practice the decisions of the Plenum is to raise higher and higher in the consciousness of every soldier the overall national significance of the job which has been entrusted to him; to insure that communist convictions and patriotism are made manifest in specific acts: in superior accomplishments in the field of combat and political readiness, in the mastering of new technology and weaponry, and in the strict observance of discipline. We must surround with still more respect and honor our glorious army and naval pathfinders, our heroes of the warrior's trade, and popularize the achievements of outstanding personnel, and persistently strive for the attainment of still higher showings in the combat and political training of all personnel.

In this connection, great significance is attached to the skillful organization of socialist competition, the all-around expansion of the patriotic undertakings of our soldiers, a decisive campaign against formal, irresponsible attitudes toward commitments of competition, against everything that retards the very idea of socialist competition, and that which lowers and undercuts the indoctrinational importance of military work. "Commanders, political organs, and party organizations," points out Marshal of the Soviet Union R. Ya. Malinovsky, Minister of Defense, "must foster and increase competition in the army and navy to the level required in the modern world and make it a more active factor in the indoctrination of personnel and the strengthening of the forces' combat readiness.

The directives of the June Plenum of the Central Committee CPSU concerning the necessity of improving indoctrinational work among the youth also have invaluable meaning for the Armed Forces. Keen attention to this question, as was emphasized in the Plenum, is not explained by any kind of extreme circumstances, but by the growing demands of our society in relation to the moral make-up, consciousness, and behavior of each Soviet person, first of all, of the youth, the future of the country. Our youth is the worthy heir of the older generation of fighters for Communism; it is a great creative force.

We have not had and are incapable of having any "conflict between generations," about which the bourgeois press so passionately bubbles. In the Soviet land, throughout all segments building communism, including the Army, both old and young stand in one rank as active builders of a new world, and are its selfless defenders. Our people are justly proud of their youth. However, it is impossible not to notice also that among young people are encountered bearers of Philistine, unhealthy attitudes and tastes, and those who enjoy living at the expense of society. And if they are not corrected in time, they may easily turn into malicious destroyers of the social order, flouting state as well as military laws.

In work with youth it is especially important to properly combine exactingness with sensitivity and academic tact, and a thoughtful attitude toward their inquiries, remembering that they still lack experience in life. At the same time, it is necessary to constantly take into account the general cultural level attained by the youth.

The skillful reliance of the indoctrinator on the collective support is of overwhelming importance in the solving of indoctrinational problems. The military collective, just like every other Soviet workers' collective, is really a wondrous and mighty force whose influence is felt throughout the entire process of teaching and indoctrinating soldiers. It is here, namely in the collective, that conscientious discipline and exactitude are cultivated, and the feeling of responsibility to the Party and to the people and respect for revolutionary, military, and labor traditions are formulated. The party organization is the spirit of the military collective, doing its constructive work together with the commander, the Komsomol, and other organizations of society.

The commander is the central figure of the military collective; on him is laid the personal responsibility for the level of teaching and indoctrination of his troops; but he cannot carry on his work without relying on the Party organization and the military collective. In indoctrination, as in battle, it is possible to advance only in the company of the entire collective of the trainees, leaning on them, using their knowledge, strength, and energy. Whoever has failed to understand this, has understood nothing of the essence of communist indoctrination. The requirement of reliance on collective support does not detract from the role of commanders as organizers and leaders in the indoctrinational process, but just the opposite, shows their great responsibility for the correct direction of indoctrinational work in every unit, regardless of size.

We must in every way support and expand the experience of those commanders and Party organizations, of which there are many, who have

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the ability to create in the military collective an atmosphere of wholehearted ideological life, comradeship, and collectivism, general concern about the successful fulfillment of assigned missions, and an intolerant attitude toward the slightest appearance of lack of discipline or amorality. "Skillfully organized indoctrination of personnel in the military collective, active personal contact with them, and sincere concern for them" says the Minister of Defense, "comprise the most reliable path to the successful solution of the problems of raising the combat-readiness of forces."

The paramount condition for raising the level of ideological work, as the June Plenum emphasized, is the intensification of consideration of the ideological-theoretical armament of all cadres, especially leadership personnel, and the improvement of the whole matter of propaganda and the study of Marxism-Leninism. The Plenum demanded the putting into use of all types of ideological weapons of the Party, the devotion of unremitting attention to the development in communists and non-communists of a lively interest in Marxist-Leninist studies, an end to underevaluation of the method of self-education, the barring of administratively oriented attitudes in the organization of political education, the final elimination of declarativeness and dogmatism in Party propaganda, and the perfection of its forms and methods. These edicts of the Plenum apply equally as well to the armed forces.

As has already been pointed out, much has been done in the Army and the Navy for the improvement of ideological work, but there is no basis to be satisfied with results achieved. It is necessary to strive persistently so that in every unit, on every ship, ideological work is the key, becomes truly creative, ideologically clear in purpose, interesting in content, and, of course, absolutely effective. As never before it is important to declare a most ruthless fight against the slightest manifestation of formalism, conventionalism, and callousness in the ideological-indoctrinational activity among personnel.

The harmfulness of formalism lies in the fact that it destroys live work and instead creates an appearance of prosperity. It often happens thus: lectures and reports are given, discussions led, studies conducted, group and mass measures are pursued, but "the wagon is elsewhere"; in training and discipline, shortcomings of every kind continue to be protected and at times they even become more aggravated. This occurs because these measures are pursued, as it is said, "in a slipshod manner," and mostly for bookkeeping, without a clearly set goal, without taking into consideration the inquiries and needs of the people, without sufficient attention to content and their practical impact upon the life and activity of a unit, ship, or subunit.

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Ideological work, like Party work, by its very nature is incompatible with formalism. The Party views it not as an end in itself, but as a means for the solution of practical problems -- in Army situations the task of strengthening combat readiness and troop capability. Only in this way should we come to an evaluation of the condition and level of indoctrinational work among personnel. This truth was especially emphasized by the June Plenum of the Central Committee of the CPSU.

The interests of the matter require attentive and critical analysis of the established practice of the organization of ideological work and its leadership. We must step by step review literally all sectors of our ideological front, all forms and types of ideological and educational activity in order to clearly define to what measure each of them meets modern requirements and what concrete measures should be applied for its improvement. This applies to the political activity with soldiers and NCO's and to the Marxist-Leninist training of officers and generals, mass-agitation work, lecture propagandas, the organization of scientific and military and technical propaganda, etc. As was noted at the Plenum in a speech by the head of the Central Political Directorate of the Soviet Army and Navy, General of the Army A. A. Epishev, the time has come to give serious thought to the creation of a more harmonious system of Marxist-Leninist training of officers and general officers, which insures systematic and profound study of all components of Marxism-Leninism, a more effective influence on practical work, and to think about the introduction of a system of political schools in which soldiers, sailors, NCO's, and senior NCO's might, in the course of their term of service, systematically improve their political knowledge. Many other questions arise. As before, it is important to perfect the work with propagandist cadres, and in every possible way to improve individual work with servicement. Such powerful ideological weapons as the press, radio, movies, television, and, as has already been stated, literature and art must be used more thoughtfully.

While improving propaganda, perfecting all of its forms and means, we must strive so that in every system of political training of personnel the center of gravity in affairs is carried over into the independent study of Marxist-Leninist theory, the decisions of the Party and the Government and the Program of the Party, so that all fighting men deeply understand the increased demands of our society on his consciousness, moral make-up, ideological and political training, and ideological armament.

It is exceedingly important to improve the teaching of social sciences in military educational institutions, and to activate scientific research. We must raise in every possible way the standing

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ism, scholasticism and dogmatic assertion in teaching, and unoriginal approach, mechanical cramming and timidity in scientific research. It is impossible to close our eyes to the fact that several faculty members in the field of social sciences in military educational institutions are poorly oriented in the fundamental changes which have occurred in the development of military science, do not theoretically comprehend these changes, which naturally deals a serious blow to the teaching and educational and research activities of the faculty.

The main thing is to turn the whole front of practical and scientific research toward the actual problems of the present, the problems of theory and practice of military science, toward the problems of the struggle with the various ideological currents inimical and alien to Marxism-Leninism, and in this way elevate the role of this work in the forming of a communist ideology in the fighting men of the Army and Navy, and its closest bond with the tasks of the Soviet military structure, with the greatest development of Soviet military science.

The new advancement of ideological work, to which the June Plenum of the Central Committee of the CPSU has summoned the Party, requires its best organization, the raising of the level of Party leadership by the Party. Party leadership is the basis of the foundations of success in ideological work. "Now we are working," said N. S. Khrushchev at the Plenum, "to set in motion all key factors and material means of ideological work to best organize the leadership of this important enterprise."

As was emphasized by the Plenum, in order to strengthen Party leadership, it is necessary first of all, that every Party organ from the bottom to the top earnestly and daily engage in matters of communist education and the ideological training of personnel. It is especially important to increase the responsibility of the primary Party organizations for the state of ideological and indoctrinational activity. Secondly, the "catch as catch can" declarative, dry bureaucratic approach to ideological work must be decisively eradicated. Not speechifying, not empty paperwork, but live work with the people is that which makes up the basis of the activity of Party organs and Party organizations.

The task in the future will be to persistently instill in ideological work the Leninist style which brings together in itself lofty principles, communist moral fiber, irreconcilability with inimical ideologies, a militant spirit, the creative application and development of revolutionary theory and the unity of theory and practice.

CPYRGHT

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Party organizations, states the decision of Plenum, must go deeply into the content of ideological indoctrination, more actively utilize the method of criticism and self-criticism, guarantee the unity of organizational and ideological work, improve methods and forms of Party leadership of mass education, attract more widely the forces of society, increase the role of Komsomol organizations in the communistic indoctrination of young people. Ideological work, emphasized N. S. Khrushchev at the Plenum, is a great, exacting, complex and responsible matter; it should be engaged in by cadres who know their business well, those able to correctly evaluate the phenomena occurring in various sectors of the ideological front.

It is necessary that the questions of ideology and indoctrination always be found at the center of attention of all communists, especially the leadership personnel. There must be firmly established in the consciousness of the leadership the proposition that no work is "purely ideological", just as there is no work which is "purely organizational". "Live in the very midst. Know the attitudes of mind. Know everything. Understand the masses. Know how to approach them. Win over their absolute confidence." This is a demand of Lenin, and in contemporary conditions it has the most real significance.

When commanding troops, the commanders and leaders must be models of ideological and political maturity, be fierce propagandists of Party ideas, constantly look after the spiritual and cultural growth of the fighting men of the Army and Navy. Their personal participation in propaganda and agitation, their living contact with the masses of servicemen, reliance on Party and Komsomol organizations -- this is the essence of the demands of the Party upon command personnel. "Always be with the people," said N. S. Khrushchev at a military academy graduation reception, "Consult with them, have confidence in subordinates, look after them, know their interests and attitudes. This is one of the most important qualities of a commander, of each Soviet officer."

Unity of work and deed and a lively spirit of Party creativity must permeate all of our propaganda and agitation. The main thing is that the Party word reaches the mind and heart of every fighting man, and helps him to honorably fulfill his duty as defender of the socialist Fatherland.

Realizing the requirements of the Communist Party Program, of the decisions of the 22d Congress and the June Plenum of the Central Committee of the CPSU, commanders, political organs and political organizations will achieve a new upsurge in ideological work in the Armed forces, and raise still higher their combat readiness and combat capabilities.

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The investigation of various phenomena in nature and society using mathematical methods has today become so elaborate that it is possible to speak about the well-known independence of the theory which is devoted to it. In literature abroad this scientific trend has been called "operations research". In the USSR, side by side with this term it is possible to come across other terms, such as "activities research", "the research of phenomena", and "behavior analysis." In this article we have decided to keep the term "operations research", as it is more apt, although in reference to military affairs it has the shortcoming that here the wide understanding of the word "operation" (which encompasses all military phenomena, activities, and processes, etc.) conflicts with the narrower understanding of an operation as one of the military features (together with combat and armed struggle as a whole). The advisability of retaining the term "operations research" is dictated also by the fact that it has gained quite considerable usage in literature devoted to non-military affairs. The unity of terminology is important because there is great similarity, and in many cases complete unity in the methods of research of phenomena in the various fields of human endeavor.

The theory of operations research defines and analytically describes conformity to natural law in various processes with the goal of obtaining quantitative grounds or recommendations founded on their basis for the adoption of decisions. This theory is still in the formulative stage. However, it is already being widely applied in economics, medicine, biology, industry, agriculture, and also in military affairs.

The wide usage of the methods of operations research in military affairs has been caused by the complication of military activities, by the introduction of new and powerful means of warfare, by the increase in scale of armed conflict, by the increased responsibility of command for the objectivity and precision of adopted decisions, and the possibility of correctly utilizing the means of armed combat available without exact quantitative methods of analysis.

Operations research is penetrating nearly all fields of military training. It finds greatest use in the processes of control of troops in the solution of an entire series of important operational missions such as the planning of a nuclear attack, artillery fire, the setting

of anti-aircraft fire, radio jamming, the transfer of troops, and also many rear-area tasks. At the same time, operations research may be applied in the working out of rational methods of combat operations, in the basing of the elements of modern military art, and systems of completely arming and equipping their individual prototypes. This field of application has been developed to a lesser degree, although it is very important and a greater effectiveness of operations research methods may be expected.

If we analyze the practical activities of man in the various fields of peaceful as well as a military character, it is not difficult to notice that the principal formulation and method of solving a great range of practical problems are in many ways alike. Most often the problems come down to the search for the most expedient solutions for given conditions, i.e. the selection of that plan of future action which enables us to achieve greatest success. The method of finding a solution boils down to two steps: the evaluation of the results of possible alternate solutions, that is, the prediction of various alternates of future action; and the immediate selection, on the basis of given prognoses, of the most expedient plan of future action, or the optimum solution.\*

Many practical problems of a military nature (beginning with the selection of the most expedient alternates of combat operations and ending with the working out of a new organizational structure of the organs of control) also may be viewed from unified positions as a process of decision making.

The similarity in the formulation and methods of solving a great range of problems unites the practical activities of people in the most varied fields and permits the use in other fields of methods and devices used for solution-finding in a given field. The question automatically arises, is it not possible to work out scientific methods for the substantiation of solutions, methods which are identical for many areas of human activity. Such methods would allow the scientific augmentation of all of the most important decisions in practical human activity, and would maximize the effectiveness and expediency of this activity.

The advent of operations research in our country to a significant degree enabled, even before the war, the reworking of methods for evaluating the effectiveness of artillery and aerial gunnery and aerial bombardment. With the help of these methods two important

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\* Often these two steps are so tightly and organically interconnected that it is difficult to separate them from one another.



groups of problems were solved:

- The evaluation of the effectiveness of existing weapons in solving concrete battle problems;
- The evaluation of the effectiveness of newly developed weapons systems.

A large contribution to the development of these methods was made by Soviet scientists A. N. Kolmogorov, V. S. Pugachev, Ye. S. Bentsel', V. F. Dolkhovitinov, and others. The first attempts at using mathematical methods in planning the economy were made in the prewar period. In 1939 the Soviet scientist L. V. Kantorovich was the first to work out and use a method later called "linear programming" in the planning of the work of industrial concerns.

After the Great Patriotic War operations research methods developed quickly. From the solution of individual problems, scientists began to switch to the complex evaluation of the effectiveness of weapons systems and even of certain types of combat operations. Operations research methods received wide dissemination in other fields also: industry, transportation, and economics.

A great deal of attention is given operations research theory abroad. During World War II operations research groups were established in the armies of the United States and England. These groups conducted investigations of military operations, as a rule, on the basis of experience gained in previous combat actions.

In the post-war period operations research theory was confronted principally with problems of a new direction, linked with decision-making in the absence of any experience in the conduct of similar operations, i.e. problems whose solution was possible only on the basis of scientific prognostication.

Almost all of them turned out to be problems of a military nature, since there was no experience in the conduct of combat operations using nuclear missile weaponry, and the times demanded the solution of a great number of problems of nuclear warfare. The scientific methods worked out in the years of the past war could not be used for the solution of these problems. An intensive development was begun of the methods of scientific prognostication and determination of optimum solutions under conditions where corresponding experience was lacking. Analogous practical problems arose in economics and other fields. During the same period it became clear that it would be necessary to scientifically solve current problems of troop control linked with the basing of battlefield and operational decisions, by feeding similar problems to the computers which were then available.

In the post-war years operations research theory made great strides forward both in the direction of the development and perfection of various methods of research (primarily in methods of prediction), and in an expansion of the range of problems being solved with the aid of these methods. Operations research must replace, and already is replacing, all subjective, irrational considerations, such as intuition or instinct. It must oust tentative comparisons of a qualitative character and replace them with qualitative mathematical bases. However, operations research methods, as a rule,<sup>2</sup> do not furnish the solution to the problem itself, but only give its quantitative, numerical basis. One is not blindly guided by this basis, but takes into account a number of factors and concepts which cannot be expressed quantitatively (the moral-political factor, training, etc.)<sup>3</sup>, and only after this does he reach a final decision. In addition, one may be inclined to disagree with the quantitative data obtained and to ignore it. However, in this case one must keep in mind that he is acting in a fashion which will not give the best results, and that he is not protected from gross errors.

Under conditions of increasingly complex military operations, reaching a sufficiently reliable decision is linked with the necessity of taking into account a large number of different factors. A complete consideration of these factors in solving primary tasks is possible only with the use of scientific argumentation and scientific methods of operations research, which allow the finding of a quantitative basis for the solution. In the process of prognostication, all of the most important factors of the given phenomenon are taken into consideration not tentatively and qualitatively, but precisely and quantitatively, and this improves the quality of the solution.

It must be said that the unusual complexity of military operations, and also the presence of a large quantity of random factors

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2. In a whole series of practical problems there is the possibility of finding not just the basis, but the solution itself. For instance, in the problem of distributing nuclear strikes or artillery fire over targets, we can find by operations research methods a single distribution whose total damage to the enemy will be the maximum.
3. At the present time a number of native, for the most part [illegible], specialists are attempting to take into account similar factors by the introduction of a system of [illegible] coefficients.

determining the progress of military operations serve many military experts even now as a fundamental argument, and has given rise to doubt the very possibility of using mathematical methods to analyze military phenomena. And as a matter of fact, the nature of these phenomena is very complex. No one operation (in both the narrow and broad sense) is a copy of another. But nevertheless, possibilities for the mathematical analysis of military operations do exist. In the apparent conglomeration of random factors, apparently completely unrelated to each other, there exist certain regularities, including mathematical ones. This is explained by the fact that within certain limits, military operations are inherently recurrent; they have, so to speak, statistical stability.

Dialectical materialism teaches that there is no such thing as a phenomenon which is beyond the grasp of the mind, but there are still phenomena which are not yet known. This is true of military phenomena which are yet not understood from the point of view of the manifestation of their quantitative and mathematical conformity to natural law. The creation of a mathematical model of modern military operations of varying scale and character is a very complicated task, but a completely practicable one.

If one investigates the basic mathematical machinery for operations research, then it is not difficult to become convinced that it is not new. These procedures were known earlier. They found use and are still finding application in other sciences for resolving altogether different problems. And although it brought about basic changes in operations research, and although many new methods of operations research have come into being, the rapid development of the theory of operations research would have been impossible without the remarkable successes in the exact sciences, mainly in mathematics and applied physics. The creation of electronic computers, making it possible to quickly make large computations with which the application of methods of operations research are connected, also played a most important role.

Incidentally, operations research is not infrequently considered a mathematical method of using computers in practical problems. This is incorrect. Operations research is a scientific school which has its own methods and goals; computers merely aid in the operational use of these methods when solving practical problems. However, the machines solve many problems which bear no relationship to operations research.

In operations research there are two basic methods: the method of statistical analysis, and the method of mathematical prognostication. The principal difference between the two lies in the fact that in the former, the analysis of past operations is made, and in the

latter, future operations are predicted, although in both cases the final goal is the same -- to find the best solution, the best plan of future operations.

The method of statistical analysis is a posteriori (inductive) based on the experience of past operations. Statistical data concerning already completed operations is a necessity; it is on the basis of an analysis of this data that a solution is found.

The method of mathematical prognostication is an a priori (deductive) method. It assumes that there is no past experience of conducting similar operations. The solution here is found on the basis of scientific foresight and the mathematical prognostication of the expected results of future operations.

It should be said that in practice the application of one or the other of the methods named presupposes the use of the other, even if only the partial use. For example, for operations research by the method of mathematical prognostication, the statistical analysis method may be used in determining several of the elements of the operation. Specifically, with its help it is possible to process test-firing data of individual types of weapons and combat material. However, this does not change the character of the operation as a whole; it is still solved by means of prognostication.

A large number of practical problems was solved by means of statistical analysis during the Second World War. Operations research teams created at that time collected quantitative data concerning conducted operations of the air and naval forces and of antiaircraft forces, analyzed the data, and gave the commands of the various branches recommendations for organizing systems of anti-aircraft and anti-submarine defense, concerning tactics for the application of individual types of weapons and the improvement of performance or the expediency of using arms and equipment.

The final goal of statistical analysis is to improve the solution, the organization of operations, which may proceed approximately under similar conditions. This method presupposes the availability of the necessary statistics and sufficient experience in the conduct of operations similar in conditions. It is based on a simple mathematical system and involves a small volume of computations. All of this allowed the productive use of this method during World War II, at a time when there were no electronic computers, and at a time when the mathematical system of prognostication had not been sufficiently developed or widespread.

However, a number of difficulties arise with the use of the statistical method.

First, there is the necessity of obtaining a sufficiently large quantity of statistical information concerning operations which are similar in nature. Only in this way is it possible with a greater or lesser degree of certainty to recommend this or that measure for the improvement of the organization of an operation. True, many methods in mathematical statistics have now been worked out which make it possible to reduce the necessary amount of data or to build hypotheses using random samples.

Secondly (this, I think, is the greatest difficulty), is the absence of a strict mathematical definition of uniformity, the absence of a similarity of operations. It is very difficult to establish firmly whether or not the conditions of the operations being analyzed are alike, especially if the operations are complex.

Thirdly, there is the difficulty of obtaining sufficiently objective information concerning the operation which was conducted. Subjective data concerning military operations often lead to incorrect conclusions and make the application of the method impossible. Getting objective information in the course of complex operations, even if special observers are used, is still an unsolved problem.

The method of statistical analysis has the great disadvantage, that of finding the most expedient solution which is achieved at a great cost -- by means of conducting an entire series of operations, each of which is purposely organized in a non-optimum fashion.

In spite of this, the method of statistical analysis plays an important role in military research in solving the following problems:

- the discovery, verification, and improvement of various kinds of recommendations in the course of military operations (excluding decisions arising during combat and operations).

- a quantitative analysis of past wars.

- a quantitative analysis of past war games and exercises with the view of finding a quantitative basis for the solution of the most varied operational and tactical problems.

The basis of the method of mathematical prognostication is scientific prediction using the entire arsenal of modern mathematics and the richest contributions of the exact sciences. To define with a great deal of accuracy the complete quantitative characteristics of a future operation with the help of the method, as a rule, does not work well. Usually, therefore, only the expected result of planned operations or its probability is defined. The distinctive

feature of this method lies in the fact that it is necessary to find a solution in the absence of experience of carrying out detailed operations. Under these conditions complex mathematical methods must be used in order to obtain sufficiently reliable results. In the course of solving practical problems, a number of original mathematical methods was created, since the classical systems of higher mathematics, in many instances, turned out to be unsuitable for solving problems connected with prognostication and finding of optimum solutions.

Let us examine several military problems which may be solved by the method of mathematical prognostication.

In the planning of an offensive operation the problem of the most expedient allocation of designated nuclear ammunition to assigned objectives in the zone of combat operations arises. In this, the latter are not accurately determined by reconnaissance --- but with some degree of reliability, their characteristics bear a tentative, probable nature. Tentative information concerning the enemy may change even up to the moment when the nuclear strikes are delivered. The structure and possibilities of their available means of delivery also may be essentially altered because of enemy influence. In this ill-defined situation it is necessary to allocate nuclear ammunition with the greatest expected effectiveness, which is given to mean the maximum blow delivered upon the enemy, the expected number of destroyed targets, and the minimal expenditure of ammunition, etc.

In a division this problem is resolved well enough without the use of mathematical methods. But under unified forces (larger than a division) it can be solved most correctly only by means of mathematical prognostication, with strict regard and evaluation of every uncertainty. From numerous possible alternatives an optimum solution will be chosen on the basis of scientific mathematical prediction from which the greatest effectiveness in a given situation is to be expected.

Let us dwell on still another problem --- the determination of a weapons system which is expedient, given the modern nature of combat operations. For its solution it would be possible to draw from the experience of past wars, but the sharp changes in the character of modern combat operations does not allow us to make full use of this experience. Again prediction and prognosis are required. It is necessary to recreate a more probable picture of future military operations and make recommendations concerning a rational weapons system. This problem may best be solved by using the mathematical prognostication method.

At the present time two basic schools of mathematical prognostication, two variants, have been outlined: "mathematical simulation" and "effectiveness evaluation".

In mathematical simulation a mathematical picture of the entire operation is created to a certain degree of detail; then research is conducted on the mathematical model and optimum values are established for those parameters of the operation whose size can be affected.

In effectiveness evaluation a complete mathematical picture of the operation is not reproduced. In this instance a certain indirect exponent is selected -- the so-called criterion of effectiveness; its mathematical dependence on basic quantitative factors (parameters) of the operation is established; then the values of the parameters are found which ensure the highest numerical value of criterion of effectiveness.

Both of these trends are based on the idea of mathematical prognostication, but the approach to the solution of the prediction problem and the finding of the optimum solution is different in principle. Mathematical simulation is a direct method of prognostication. Here the nature of the course of the operation is judged by the model obtained as a result of the mathematical description of the basic laws governing the given operation. The method of effectiveness evaluation is an indirect method of prognostication. The whole mathematical picture of the operation is not reproduced. The successfulness of the operation is judged only by some indirect index -- the criterion of effectiveness.<sup>4</sup>

From the practical standpoint these varieties of the method of prognostication differ in the degree of complexity of the mathematical system and the possibility of their solution on electronic computers. Mathematical simulation is very complex and as a rule can be computed only on large stationary computers. The method of effectiveness evaluation is rather simple and can be successfully computed on small computers, including field types, and if the work is organized properly an optimum solution may be found in a very short time.

Hence, the application of mathematical simulation is recommended for use in large headquarters and scientific institutions in solving various theoretical and practical problems such as the selection of

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<sup>4</sup> In actual problems there are usually several criteria, or they find generalized criteria of effectiveness.

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an optimum system of armament for troops or of individual models of arms, the determination of expedient tactical situations, operational skill, strategy, and different standards, etc. The creation of a mathematical model allows a more valid approach to the solution of problems by the method of effectiveness evaluation -- to correctly choose the most important criteria of effectiveness and to establish their connection with the parameters of the operation.

We will apply the method of effectiveness evaluation mainly in solving various problems in the field of control of troops, which arise in the planning as well as in the course of combat operations during decision-making. The proximal nature of the method here is more than compensated by the speed in obtaining optimum solutions, which underlie the commander's decision. In isolated instances this method may be used in solving another type of practical problem not related to the sphere of control -- for example, in determining rational operational and tactical standards, or characteristics, of arms. However a more exact solution of these problems is achieved by examining a mathematical mock-up of a battle or operation, or some of their elements.

Mathematical simulation at the present time is developing along two basic lines -- the creation of analytical models and stochastic (random) models.

In an analytical model all basic quantitative factors of an operation (operational parameters) are expressed, and are inter-related in the form of analytical dependences expressed as different kinds of equations. The analytical model is a system of these equations which is further explored with the goal of arriving at a recommendation concerning the selection of this or that parameter of operation.

A typical example of an analytical model is the differential equation of combat operations (Lanchester's equations) and their numerous varieties. Even in simplest form Lanchester's equations prove to be very beneficial in obtaining recommendations for the solution of a number of the most important operational and tactical matters -- for example, the impact of the initial relative strength on the course of combat, given various tempos of troop replacement by both sides, and the impact of anticipation of the enemy's first blow on the future course of combat operations, for various balances of forces and given various lead-times of warning.

Random model simulation, the so-called Monte Carlo method underlies the mathematical method of statistical experimentation. Its distinctive feature is its experimental nature. The entire operation is represented as the sum total of interdependent random

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occurrences -- the elements of the model. For each phenomenon random characteristics are established (the law of distribution of probabilities, its parameters etc.). These phenomena are reproduced by a separate block, which is interconnected with other blocks.<sup>5</sup> Such a model is played a sufficient number of times to obtain the necessary results -- the expected values of the parameters of the operation. The optimum variant is selected by means of a series of alterations of the model and comparison of the results. With a large quantity of component elements, operations of the hypothesis concerning the law of the distribution of each element is based on common sense and usually does not cause doubt.

Random simulation is presently used to reproduce battles involving separate means of combat (for example, anti-aircraft or tanks), or of small sub-units, that is, for the creation of micro-models. The method will also be used for the creation of macro-models -- models of military operations involving units of regimental size and even divisions. The random (stochastic) method, besides its independent worth, is also helpful in preparing analytical models and in checking the hypotheses brought forward in them.

In realizing the principal schools of mathematical simulation -- analytical and random (stochastic) -- the most varied mathematical equipment is used: the theory of probability, mathematical statistics, mathematical and functional analysis, the theory of mass handling, the game theory and others.

As has already been pointed out, with the method of effectiveness evaluation concerning the successfulness of an operation, judgement is not made according to the whole mathematical picture of the operation, which is not reproduced in this case, but according to another index. For example, the success of an offensive battle is considered successful if they cover 100 kilometers a day. The relative losses of one's own forces and the forces of the enemy may be taken as an indirect criterion for the evaluation of the successfulness of a battle. If, in the course of a battle, this criterion is less than one unit and has the tendency to be less, one may say that the battle is proceeding favorably.

It is completely understandable that it is impossible to accurately evaluate the success of an operation by one or even by several criteria. One may get only a tentative evaluation but the approxi-

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5 The computing of random model on machines in the form of individual blocks was the reason for calling this method of simulation the block method.

effectiveness and tentativeness of optimum solutions in this case is more than compensated for by simplicity, and hence, the possibility of getting the necessary information quickly. Along this same line one must not forget that the methods of operations research, as a rule, do not provide a solution, but rather a quantitative basis upon which to make a decision. In obtaining this basis, a high degree of accuracy is not often required.

In the practical use of the method of effectiveness evaluation there are two stages of research: the first is the mathematical formulation of the practical (operational-tactical) problem, and the second is the solution of the mathematical problem and finding the optimum solution.

Mathematical formulation includes:

-- The selection of the criteria of effectiveness or a system of criteria.

-- The definition of the basic quantitative factors, the parameters of the operation upon which the selected criteria of effectiveness depend.

-- The elicitation of the quantitative dependence (the functional connection) of the criteria of effectiveness on the parameters of the operation, the result of which is an analytical expression of the function of effectiveness, which defines the quality of the solution.

-- The establishment of the range of variation of the function of effectiveness and of the operational parameters of the explored operation or problem, as result of which the analytical expression for the domain of definition is found.

After the first stage the formulation of the practical problem is purely mathematical, as is the problem of finding the minimax (maximum or minimum) of the function of effectiveness with the variables limited to their domain of definition.

The first stage is the most crucial and important. The success of the solution, however accurately the peculiarities of the problem have been studied, depends upon it. Here specialized mathematical knowledge is insufficient; one must know intimately that area from which the problem must be solved. It is here that mathematical and military sciences are united. Allow the smallest mistake to be made in the presentation of the problem, and no matter how accurately it is solved from then on, the result will be incorrect. The whole of the vast arsenal of mathematics is used in the presentation of the

problem, the most important being mathematical analysis, mathematical statistics, and the theory of probability.

In the second stage the problem of searching for optimum solutions arises -- finding the minimax of a function with many variables with the limitations of each of them. Similar problems were successfully solved long ago by the classical methods of variance calculation and methods based on the study of derivative initial functions. The application of classical methods for solving problems of operations research, however, proved to be quite impossible or involved tremendous practical difficulties in the majority of cases. The latter were caused by the great number of variables and, most of all, by the many limitations imposed upon them. In connection with this a number of new methods were worked out for finding the minimax, as a rule, computative, worked out for their solution on digital computers.

Linear, non-linear, and dynamic programming, which are at the present time known by the general term "methods of mathematical programming", were practiced on a large scale. Lately a method of optimization worked out by the academician, L. S. Fontryagin, has appeared, which is based on the application of classical variance methods for the solution of so-called "non-classical" problems. However, it is not yet practiced on a large scale in operations research.

The selection of a method of finding a solution depends greatly upon what type of problem was formulated in the first stage. If the function of effectiveness is linear, the method of linear programming is used, if it is non-linear -- the method of non-linear programming is used, if a step-by-step selection is necessary -- the dynamic method is used, etc.

The games theory occupies a special place in the method of effectiveness evaluation. It is used first of all for the postulation of problems in the first stage. The peculiarity of the games postulation lies in the fact that together with direct action, the counter-action, deliberate or accidental, of the opposing side is observed -- the response. Mathematically a games problem is formulated like a regular effectiveness evaluation problem and coincides with a linearly programmed problem -- it comes to the search for the minimax of a linear function. In the simplest cases a games problem may be solved with the aid of special elementary procedures without mathematical formalization and apparatus for linear programming.

It is proper to emphasize that operations research possesses its own particular methodological principles which differ from those of mathematics, although in operations research mathematical principles find wide application. Unfortunately, and especially if a com-

puter is used, any application of mathematics in the solution of practical problems is improperly considered an application of operations research.

Let us now dwell briefly on the relationship of cybernetics and the theory of operations research. In our opinion, cybernetics and the theory of operations research are independent scientific schools.

Cybernetics is the science of guidance. It establishes the general laws of the processes of guidance, independent of its material nature, and provides general methods of description and research of the processes of guidance with the aid of the theory of algorithms and the theory of information.

Operations research is the theory of decision-making. It establishes the general laws of decision-making in numerous fields of practices, and provides methods for the research and discovery of the optimum solutions of a great range of practical problems.

In our opinion, it is incorrect to consider the theory of operations research as an integral part of cybernetics on the grounds that decision-making is the most important stage of the closed process of guidance. We must not forget that the problems solved by the methods of operations research also arise outside of the sphere of guidance, and that these problems are in the overwhelming majority. Together with this, methods of operations research find wide application in cybernetics for the discovery of optimum algorithms of guidance processes and their detailing for the purpose of their reproduction on computers. And conversely, in operations research cybernetic methods are often used, as for example, the theory of algorithms in mathematical simulation. Therefore, a close interaction takes place between the two new scientific schools, different in theme, objectives, and methods.

In our opinion, the theory of operations research must be combined organically with tactics, operational skill, and strategy. The methods of operations research must be widely adopted in the evaluation of the military effectiveness of comprehensive weapons systems. The organic unification of the integral parts of military science and the theory of operations research will require good mathematical training of military personnel, and a knowledge of the methods of operations research.

We consider that the time has now come when it is necessary to organize the training of military cadres in the basics of operations research, through military schools, instructional courses, and military academies. For this, it is necessary to include in the programs

of middle and higher command educational institutions a special applied course in operations research.

For the planning and study of especially important problems it is advisable to create individual groups of officer-operators and mathematicians.

In order to insure a wide introduction of the methods of operations research into practice, scientific institutions must not only offer these methods and principles and their uses in popular form, but also show the ways, areas, and dimensions of application of the theory of operations research in the analysis of military operations and unit training exercises. The use of every command-headquarters and unit training exercises being conducted for the purpose of procuring the quantitative data necessary for research will be very beneficial. At this point it is especially important to emphasize that operations research is possible with the aid of not only higher but also elementary mathematics and is within the reach of all commanders in elementary form.

Many people are concerned over the question as to whether or not the use of the methods of operations research conflict with the creative nature of the work of military specialists. As we have already pointed out, the methods of operations research permit one to reach not the final solution itself, but its quantitative basis. And it is this basis that widens the scope of the military specialist's vision, that allows him to better orient himself in the situation, and finally to select a scientifically-based solution to the practical problem before him. Thus, the realm of the commander's creative activity does not become narrower, but on the contrary, is widened. The commander is freed from the tedious evaluations and estimations necessary for quantitative data, and is given more opportunity for the creative search for optimum solutions, taking into account his experience, knowledge, and talent. Such an arrangement of work, elicited by reality, exists even now in the control of troops, when a commander, in making a decision, makes use of data prepared for him by headquarters and the heads of the services.

The great achievements of science and technology have made it possible to equip our Armed Forces with first rate weaponry. Now they are faced with an important task -- to make use of this powerful military technology with the greatest effectiveness for the long-range improvement of their defensive capability. The correct solution to this problem constantly demands profound scientific argumentation of the most important decisions, and this is provided in the best possible way by the use of the methods of operations research.

## THE FACTORS OF SPACE AND TIME IN MILITARY OPERATIONS

CPYRGHT

by Maj-Gen S. Dronevskiy

New weapons have always brought about changes in the military art and have brought on a re-evaluation of the significance of space and time in military operations. Thus, the development of aviation made air space accessible, and it was used for military operations. This caused serious changes in military science, having greatly enhanced the significance of time and lessened significantly the role of space as a factor which separates belligerents.

The application of military aviation made it possible to carry out deeper and more accurate reconnaissance of the enemy on land and sea, and to attack targets which are situated far behind the lines of actual military contiguity. The speed, strength and reliability of air strikes rapidly increased. Aviation made accessible that which, before its application, had been impossible to reach.

Along with the development of aviation, the means of crossing land and sea space were also being perfected. As a result, tremendous changes took place in military science both before and during the Second World War, and the meaning of space and time in military operation took on a new light. The operations of the Second World War in the decisive theaters acquired a clearly distinguishable character of maneuverability; their spatial scope increased; the objectives of many operations were reached in shorter periods of time than in the First World War.

The problem of space and time in military affairs covers a very large range of questions. In the present article we will attempt to look at only those which are connected mainly with an evaluation of the new role of these factors.

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The armed forces of the principle states of the world are equipped with nuclear weapons which, within a very short space of time, can be delivered to a target from almost any distance. In light of this, no state could consider itself safe in the event war breaks out. It is entirely possible, that if the imperialists succeed in unleashing a new world war, it will encompass several continents, that is, it will be an intercontinental war from the very beginning. The attainment of strategic objectives in such a war will entail the necessity of overcoming great distances.

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The decisive goals and means of armed combat will condition the development of large-scale military operations and the involvement of vast armies from both sides. Together with nuclear weapons a great number of so-called conventional weapons will inevitably be used.

Military operations in the initial period will quickly encompass several land theaters, sizable air space and the expanses of the oceans. And time, in the apt expression of N. S. Khrushchev, would vanish "in a flash". In connection with this, the spatial scope of the strategic maneuver will increase. A maneuver by means of a nuclear attack with a view to delivering rocket and air strikes upon the enemy in spacious theaters and in his rear will have a decisive significance.

Strategic operations conducted with the participation of all types of armed forces will be the basic form of combat in a theater of operations. The chief role in such operations will belong to missile forces. But what role will space and time play under these conditions?

Modern speed of movement of combat materiel and transport reduce the time needed to overcome space. Due to this, the duration of a maneuver undertaken with the view of encountering a disposition of enemy forces or reaching his military-economic area is shortened, the possibility of surprise attacks increases, and military operations themselves take on a fast-moving character. The time required for closing with a target is greatly reduced when nuclear weapons are delivered by missile. In conjunction with this, the factor of time in the contest for strategic initiative must be re-evaluated when choosing the moment for striking a blow against the enemy, and when working out the requirements for the combat readiness of troops. In these and in other matters of modern military science, errors involving the loss of time will count critically, since it is very difficult to correct them in consequence of the rapid development of military events.

In past wars, troops, poorly supplied from a technological viewpoint, advanced slowly and wasted much time on a maneuver, since their operation depended on the surrounding terrain, the season, and the weather. Great expanses, especially water, made it extremely difficult to carry on operations, and in a number of cases hindered a surprise invasion by the enemy, or, at any rate, permitted considerable time for countermeasures. In our time, space has lost this characteristic and is no guarantee against strikes by new weaponry if one takes into consideration only the linear measurements of the theater of operations; that is, the straight-line distance to the target.

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However, this does not mean that space has completely lost its protective characteristics and that the problem of its use in military objectives has already been dismissed. At the present time the principle of the distribution of forces and fire power has gained general recognition. This was not by chance, since even in modern conditions the opportunity has been preserved to utilize considerable areas of the earth's surface upon which are spread out troops, mobile reserves, emplaced and camouflaged rocket launchers, early air warning systems, and supplies of material. Even sea space has not lost its defensive characteristics, in so far as the great expanses of the world's oceans are extremely useful for maneuvering highly mobile missile-carrying ships and submarines with the newest power sources.

The principle of the distribution of forces for defense against enemy fire is not new and has been a part of military science since the adoption of firearms. Now, however, it has gained a new quality due to the fact that now it is necessary to disperse not only combat formations but also the operational structure of the armed forces, military and industrial enterprises, and the populations of large cities in the rear, far beyond the boundaries of the theater of operations.

The role of space in military science is far from being exhausted by defensive characteristics. It is the arena of an armed conflict, its extent and ability to reflect the structure of the material environment, that is, natural and other military-geographical conditions, that determines the character of military operations.

Let us now examine in somewhat more detail the role of space and time in several concrete questions concerning the conduct of a nuclear missile war. Let us first of all touch upon the role of space and time in operations of armed forces aimed at disorganizing the enemy's economy.

The productive forces and the centers of government of the belligerent nations are situated on land, and here the armed forces are also based. Therefore, the loss by a state of territory or the destruction of vitally important enterprises which have great political, military, and economic significance irrevocably leads to dire consequences. The ability to fight for these territories will depend upon their geographical location, remoteness, the nature of the enterprises, and the means of attack. It is clear that only the forces, means, and ability to apply them are needed for the destruction of targets in an enemy's economic regions located on a remote continent. It is altogether different if the regions are located within the limits of adjoining continental theaters of operations. In the latter instance enemy facilities have been positioned closer,

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and it is easier to conduct reconnaissance, and these targets can be hit by operational and tactical missiles and struck by tactical air power, etc. Finally, they can be captured by ground forces comparatively quickly. The matter is more complicated in operations aimed at weakening the economic potential of the enemy by the destruction of industrial enterprises in remote regions.

In the First World War economic potential was weakened through the use of military blockades, the military technology of that time could not effectively destroy remote military industrial objectives. The entire Atlantic and the seas bordering upon Europe were enveloped by the blockade, and the zones of underwater warfare extended to the Atlantic coast of the United States and to the shores of Western Africa. German cruisers operated in the world shipping lanes of the Atlantic, Indian, and Pacific Oceans. Troops being transported, military cargoes, strategic raw materials, goods and food supplies, and means of transportation were destroyed in the course of the blockade.<sup>1</sup> Ground and air operations did not cost the economy of the belligerents great losses; only Russia suffered great losses, having lost in the course of the war Poland, the Baltic, and the western provinces as far as the Lake Naroch-Lutsk line.

As a result, operations to undermine the economic potential of states by means of their isolation proved to be dispersed over a large area, prolonged and ineffective, especially when they were carried on against large countries. Those countries possessing large land areas and leaning upon the chief industrial and agricultural regions untouched by the war and those having at their disposal considerable time in the course of the war, to one degree or another coped with the problem of restoring the losses and supplying the front with men and materiel. However, for the states which possessed comparatively small territories, such as Germany, the blockade created considerable difficulty, especially in supplying food.

In the Second World War, together with the naval blockade and the jamming of communication lines aimed at reducing the enemy's economic potential, an effective new method was widely used -- strategic aerial bombing. But even in this war there still remained a great deal of territory which was inaccessible to air power. For example, right up to 1944 American strategic air power could not reach the eastern regions of Germany and the oil regions of Rumania from bases situated in England. Up to the end of the war, the Urals,

<sup>1</sup> In 1917 Germany sunk more than 2,700 enemy ships with an overall displacement of 6.3 million tons.

CPYRGHT

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Siberia, not to mention the entire territory of the United States and Canada, retained their defensive characteristics.

The Second World War did not bring any basic changes in the role of space in the fight to undermine the enemy's economy in remote regions, despite the significant expansion of the area under fire and the reduction of time needed for achieving results of military operations within this zone. German industry was not seriously undermined by aerial bombings of American-English air power, although it suffered considerable losses. In the course of the Second World War attempts were made at large-scale planning for the struggle to undermine the economic potential. For example, in France in 1940 a Ministry of Blockade was created, and the Anglo-American command included in its campaign special strategic missions aimed at destroying economic enemy targets.

Under modern conditions the military potential of states permits the realization of the true mass destruction of war industry and lines of communications in the interior of the strategic front of a conflict, including those on other continents. The conflict aimed at the destruction of remote military-economic regions will acquire an entirely different character, since all modern weapons operating over long distances will be used in it.

Armed conflict in these regions will apparently first of all take the form of concentrated strikes by strategically advantageous means of nuclear attack. The delivery of a nuclear weapon to a target on another continent requires in all only several minutes, and all operations will proceed swiftly and, depending upon enemy resistance, will generally take comparatively little time.

The sharp decrease in the duration of military operations raises in turn the solution of such problems as increasing the accuracy of the delivery of destructive weapons to a target, which may be accomplished only by a high degree of perfection in the construction, manufacture, and application of guided missiles, and other means of delivery. It will be necessary to solve a number of operational and purely technical problems connected with the direction of such operations. For example, the newest cosmic methods are needed for strike reconnaissance.

The spatial scope of the application of offensive weapons for the destruction of remote military-economic regions will be extremely great. Guided missiles travel over very long distances and along the most diverse and advantageous routes. "New global rockets," as N. S. Khrushchev pointed out, "can fly around the earth in any direction and deliver a blow upon any western target." It is perfectly clear that in the present case space completely loses its defensive

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qualities, that is, in linear measure.

However, space will retain its defensive characteristics in square measurement, and since the enemy may disperse his military and economic units over large areas, strikes would be more effective if directed against the most important selected targets, and there are grounds for directing them against entire areas.

Consequently, in case of a joint strike delivery with the goal of undermining economic potential, the side having at its disposal the most territory, and having its enterprises dispersed, covered, and camouflaged, will be in a more advantageous position. N. S. Khrushchev turned his attention to this characteristics of space in modern warfare, pointing out that, "a state which comes under surprise attack, if, of course, we are talking about a sufficiently large state, will always have the capability of showing the aggressor the needed resistance (*italics ours - S. B.*).

On the contrary, those countries which are small in territory and have a high concentration of economic and military installations and also a high density of population, would find themselves in a very difficult position.

In a coalition war both sides would have at their disposal great expanses. However, the countries of the imperialist camp are separated greatly by expanses of the oceans and seas, and the countries most developed industrially which have entered into it, with the exception of the United States, are situated in small territorial areas; in case of war they would immediately suffer irreparable losses. It is impossible not to take into consideration the profound political and economic contradictions inherent in this camp, contradictions which would inevitably become stronger in the course of a war. At the beginning of a war it will be necessary to evacuate the population, maybe even to foreign territory. Still, before the war foreign territories will be used for the disposition of troops and stores of other more powerful countries. All of this, undoubtedly, will aggravate existing contradictions and give birth to new ones. Consequently, in working out matters of application of offensive weapons against rear area targets, it is necessary to view military-economic regions not simply as geographic space. It is necessary to take into consideration of what states are they a part, what place they occupy in their economy, and what place they occupy in the coalition.

Let us now dwell upon the role of space and time in military operations in continental theaters. The nature of these operations will of course be different. However, space-time characteristics also must be seriously considered when planning and executing operations.

In past wars, the extent of a theater had a large influence on an offensive. Thus in one theater for the achievement of planned objectives, it was necessary to conquer a great depth of territory, and under these conditions the armed forces of an enemy, using advantageous terrain features for defensive purposes, rendered stiff organized resistance and the offensive took the form of a series of successive operations. In their course, a large spatial range and a high tempo of forward movement often complicated maneuvering by reserves, caused a lag in the establishment of airfields, and contributed to the increase in the extension of communications and the separation of forces from their railhead.

In an less expansive theater it was not necessary to take over so large a space, and the entire offensive could be limited to the execution of one or two operations. History, of course, has known many offensives, which even though they were not deep thrusts, cost much effort and sacrifice. The many offensive operations of the First World War, in particular, during its static period may serve as an example. But in these instances the difficulties were created not so much by space with its extent and composition as by other factors. Space as an objective factor with the increase in its dimensions under a single level of technical supply of troops inevitably complicated combat operations. Therefore, every small-scale offensive was usually accomplished considerably more easily than an offensive consisting of a series of successive operations. In the Second World War, the German Command, having learned how to count on the peculiarities of military and geographical conditions of the western part of the European theater, carried out an offensive using the advantages of short distances. The depth of an offensive undertaken in May - June of 1940 against the Anglo-French forces in the first stage did not exceed 350-400 kilometers, if we consider it up to the Pas de Calais; and following the turning of the axis of the offensive in the direction of Paris, it increased on the whole 20 kilometers, that is, the second stage was shorter yet.

In modern warfare the extent of a theater now, of course will not be able to play its former role in the fate of an offensive inasmuch as the technical supply of troops allows him to conquer space faster and easier even under the most complex of conditions. However, technical equipping will require more complex and precise calculation of time, ability to overcome distance, and consideration of physical and geographical conditions of the theater. It is necessary to take measures for the preparation of the theater, troops, and various combat equipment for combat operations in vast territories under rapidly changing conditions and great destruction in the path of the offensive.

The factors of space and time affect the operations of parties on the offensive and on the defensive in different ways.

CPYRGHT

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Usually having smaller forces and weapons than the attacker, the defender in the recent past had the problem of gaining the time to inflict maximum casualties upon the enemy and preserving its position, that is, the territory containing the vitally important objectives.

In the course of defense, space is used to give stability to the building of its forces and material, but losses of space are accompanied by the loss of vitally important regions, by the restraint of maneuvering troops, and by the weakening of the moral potential, since an unsuccessful defense and then retreat, as a rule, has a depressing effect of troops. In this regard it is well to remember that the missions of holding space and winning time have always had a very prominent place in defensive plans; the accomplishment of these missions permitted the assembly of strike forces whose mission it was to inflict decisive damage on the enemy in important directions.

In nuclear missile warfare, it is impossible to defend oneself against enemy action simply by the retention of space in strategic dimensions, since rocket weapons enable strikes against objectives from any distance. Neither can strategic defense win time, since the aggressor, enjoying the initiative and the massive use of nuclear weapons, is able to inflict major damage on the defense within a very short time. Consequently, strategic defense cannot be adopted in nuclear missile warfare.

Defense may find use in the solution of operational and tactical problems. The role of space and time in the solution of these problems will be determined fundamentally by the role of nuclear weapons in the attainment of the goals of defense. These weapons have broadened the spatial boundaries of operational and tactical defense both on land and in the air, and have made the problem of time more critical. The defender is compelled now to disperse his forces still wider in order to mitigate the effects of nuclear strikes on his combat systems. At the same time, having nuclear missile weaponry, tanks, and motor transport, the defender has the chance to launch destructive strikes, to maneuver widely, and to hit the advancing enemy far outside the boundaries of the defender's zone. In connection with this there is an increased need for the skillful use of territory. The center of defensive resistance is displaced farther and farther to the rear, and the requirements for the echelonment of forces and their maneuverability grow.

The maneuver of forces and weapons in the defensive zone from the rear, and along the front, takes on exceptional significance, because in the absence of continuous fronts, the enemy may appear from any direction, and the speedy transfer of forces and rocket

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weapons fire is needed to destroy him.

The role of space and time in air defense is changing significantly. The sphere of air defense is now dispersed over the entire territory of the warring states. The expansion of the sphere of air defense and the growth of the combat velocities of offensive air weapons have especially exacerbated the problem of time. The speeds of battle application of modern air defense weapons is so high that without special automated systems the control of regiments and divisions in battle would be impossible.

The spatial dimensions of theaters exerts an essential influence on the nature and capabilities of strategic dispersion and concentration of forces. In planning the transport of troops the size of the theater most of all influences the choice of the means of transport, in view of the fact that at distances of less than 1200-1500 kilometers it is usually advantageous to use motor transport, but at greater distances, railroad transport. The remoteness of some regions of the theater of operations may also influence the battle composition of the troops and their deployment for operations in these regions. A grouping of troops transported there must be strong enough and have reserves and extra materiel sufficient to carry out the missions assigned them independently of the main forces in the theater. In such a configuration they certainly will depend to a lesser degree on external help. And this is very important, since help, as a result of enemy strikes on communications, will be hard to summon.

Conquering space in armed conflict means overcoming the resistance of the enemy in concrete, natural conditions, and in other military-geographical conditions. Combat experience shows that for the attainment of strategic objectives in a given theater of military operations, troops thrown in from other completely remote regions have often been used. It is known, for example, that the Japanese forces, organized in the Japanese Islands, operated during the Second World War not only in Southeast Asia, but also in Oceania. German forces, organized in Central Europe, conducted combat operations in North Africa, while U.S. forces were thrown into Europe, North Africa, and other regions.

At first glance it may seem that the physical structure of a theater and in particular the climatic conditions, are not connected with the spatial factor. However, this is far from being so. In various regions of our planet, depending on their spatial position, the extent, relief, soil, climate, and duration of the war season are especially peculiar. This relationship would, for all practical purposes, hardly be felt in a war in one theater, but in a war covering several continents and oceans, it will be quite perceptible both

The effect of conditions in the new theater on the human organism, combat and transport technology may not only call for certain changes in the operational tactics of the armed forces; but if there are sharp deviations in these conditions from that which is customary, they may require the use of a different technology and new means of military action. Therefore a consideration of the factors of space and time in the course of modern strategic planning for a war in several theaters, and at long distance and in outer space must lead to the selection of unified armed forces, armed combat units, and their specific training for operations in theaters assigned to them beforehand. It is completely clear that their use in a new, remote theater must be justified by operational expediency, and their transfer there must be managed within an acceptable interval of time.

It is most desirable, if the situation allows, to give troops newly arrived in the new theater some time to "acclimate" and training for combat operations under new conditions.

Consequently, along with operational expediency and the general principles of military science, it is also essential to take a realistic consideration of a theater's space-time characteristics as a basis for the use of armed forces in theaters, because they exist independently of the plans for armed conflict, and neglecting them may lead to critical military failures.

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The organization of troop maneuvers and troop supply is one of the main strategic problems, and it cannot be solved without regard for the structure and use of communications in the country and in theaters of military operations. The length of strategic combat fronts in a future war and their remoteness from the main supply centers will lead to a great stretching of communications, which will probably extend across several continents, for instance, Europe and Asia, across oceans and seas, and in the air over them. A simple recollection of these parts of the world brings to mind the most varied geographical conditions, and the great difficulties which will arise to greet armed forces and transport corps in the course of military operations. In organizing circumstances the objective role of space as a factor reveals itself in full force as a factor disuniting strategic efforts because the transfer of forces and supplies will require much time. In addition, it must be emphasized that troops and supplies being transported cannot be actively used during transit; they fall out of the balance of active forces, and cannot at all be guaranteed against injury on the way. Therefore, it seems to us that

the problem of communications in a future war is most of all a problem of overcoming vast distances in the shortest possible time under conditions of enemy action with new weapons -- when the fragility of communications will increase many times in comparison with that of past wars.

Strategic plans are directly dependent on the length and traffic capability of communications. The greater the distance and larger the waste of time, (especially if communications are poorly organized) the more sharply the expenditure of combat and transport materiel rises, which holds back movement and makes difficult the conduct of operations.

This situation is readily apparent in an example of military operations in the Pacific Ocean, where, especially in the first stage, they were completely dependent on the solution of the difficult problem of the transfer of troops and their supplies across the expanses of the Pacific Ocean. The U.S. and England, in order to even the odds against Japan in Southeast Asia and the Pacific, had to allocate several times more transports, aircraft, and escort vessels than did Japan during the Second World War. Only in this way could the Anglo-American High Command deprive the Japanese of the advantages which they enjoyed at the start of the war because of the suddenness of their attack and the comparatively short lines of communication between the islands of Japan and the aforementioned regions of armed conflict.

The organization of transport in the Atlantic and the Pacific is a second example illustrating transport's direct dependence on distance. It took three or four times more ships to transport and supply American troops in the Pacific than it did in the Atlantic,<sup>3</sup> since it was possible to send two convoys to England via the North Atlantic in the time it took to send one convoy from the U.S. to Australia via the Pacific.

It also must be noted that during the Great Patriotic War transport to the front of troops, weapons, ammunition, and other freight by railroad from the Urals, Siberia, and the Far East took a significant amount of time and a large expenditure of rolling stock. A large percentage of the traffic-handling capability of our railroads went for these trips. Much metal was needed for producing means of transport (ships, steamships, railroad cars, and railroad tracks), as well as the allocation of many qualified cadres

3. M. Mateff and E. Siell: Strategic Planning in the Allied Coalition, Foreign Literature Publishing House, 1955, p. 183.



to service them. Then too, with the increase in length of communications, the expenditure of forces and materiel for their construction and use increased, and consequently resulted in the removal of these resources from the sphere of armed combat.

Thus the extensiveness of communications objectively held back the development of military operations and required many forces, supplies, and time for the organization of operations.

The dependency of strategic plans on the length of communications which has been pointed out does not yet exhaust all of the connections which exist in strategic operations between space and time and the aggregate of all measure for the organization of armed forces communications.

The fact is that communications in modern coalition wars cut across the borders of a number of states and, in organizing them, the first consideration must be the political and economic conditions in the given state through whose territory the communications network passes. It is necessary to take into account the technological condition of the lines and means of communication, for instance, the establishment of trans-shipping points between railroads having different gauge tracks, and the capability of a given state to protect the roads, even if only partial. All this and other data must be taken into account in developing a unified plan for the establishment of each type of communications, in response to the very complex military-political situation.

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Let us draw some conclusions.

Combat operations of armed forces, having duration in time and space, have their own spatial and temporal characteristics. Space imposes conditions on the distribution and distance from each other of groups of troops; time characterizes the continuity and duration of military events. Concrete space-time data, specifying means of their application, correspond to each type of armed forces and various groups created from them, in theaters abroad or on the territory of the Homeland. In this regard, the factors of time and space always move in close concert and interaction, being a sort of arena in which armed forces act in war.

The significance of these factors in military science has been constantly changing. In the case of nuclear missile warfare it once again undergoes a major re-evaluation. In a speech at the 22nd Congress of the CPSU, N. S. Khrushchev pointed out that "under the conditions of thermonuclear world war the factor of space loses its

previous significance. The Western Hemisphere will also become an arena in which will rage a storm of annihilation."

Having lost its linear defensive characteristics as a result of the use of rocket weaponry, space as an area or sphere, may weaken the results of nuclear strikes if it is sufficiently large and if objectives are dispersed and camouflaged. Many-sided efforts are needed to overcome the problems of space, but its extent and structure will profoundly influence military operations. This influence will grow with the increase in scope of military operations. The problem of time will grow especially acute. In the contest for strategic initiative time will acquire a primary meaning.

Consequently, the theaters of combat are not simple receptacles for the armed forces; the spatial and temporal characteristics will seriously affect the organization of forces and the completion of military problems by them. The armed forces should not prepare for war in general, but for war in probable theaters, the varied characteristics of which must be taken into account in the planning and preparation of actions on any scale.

TROOP COMBAT OPERATIONS UNDER CONDITIONS OF RADIOACTIVE  
CONTAMINATION OF TERRAIN

By Col L. Belausov and Col L. Sapozhnikov

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One of the striking characteristics of a nuclear explosion, together with the shock wave and light radiation, is the radioactive contamination of terrain. This phenomenon is characteristic of high and low-level nuclear explosions. It has serious effects on troops, entailing the exposure of personnel to radiation and the contamination of weapons, equipment, clothing, food supplies, and other material. As a result the personnel are struck by radiation sickness, and the combat efficiency of the troops is lowered to the point where entire units of sub-regimental, regimental, and even divisional size are made unfit for combat. Contaminated equipment cannot be utilized by troops without being treated.

All of this profoundly influences the combat operations of troops, complicates their organization and conduct, and requires countermeasures for the protection of personnel from contamination.

Radioactive contamination of terrain as a whole is an attendant factor in the delivery of nuclear strikes. But it also has its own specific character. In particular, the radiation created will affect troops for a longer time than the other destructive effects of an atomic blast. And in a surface burst or low-level air burst, it will significantly surpass in size the area affected by the shock wave and light radiation, depending on the power of the atomic charge. Radioactive contamination is possible not only in regions where atomic explosions have taken place, but also in the wake of the radioactive cloud as a result of radioactive particles falling from it. Thus radioactive contamination of the terrain may affect forces located far from the area of the nuclear explosion, who were untouched by the other effects of the atomic blast. Therefore, one should not exclude the chances of nuclear explosions being used specifically for the creation of zones of contamination to aid in the operation being conducted. This is why the radioactive contamination of terrain should especially be taken into consideration in the organization and conduct of battle actions.

1. As is known, the term "radioactive contamination of terrain" means the contamination by charged particles of a territory on whose borders the radiation level is at least 0.5 roentgens/hr.

As a result of the application of nuclear weapons by the belligerents in the theater of war, a complex radiation situation will be created, which, as a part of the general operational situation, must be considered not as a temporary, but as a permanent phenomenon which puts its imprint not only on the methods of organization, but also on how operations and battles are conducted.

There is no doubt that in a nuclear war highly important regions will be contaminated by radioactive particles. An especially complex radiation situation with widespread contaminated zones will appear in the initial period, during the most massive application of nuclear weapons by the belligerents for the most part at the "atomic barriers" created by them far in the rear, i.e. where the most surface bursts and low-level air bursts will take place. Both sides will be affected by the radiation situation, although each will try to carry out their nuclear strikes in accordance with their troop operations and in such a way that their operations are not hindered by the radioactive zones which are formed.

The effect of radiation on troops depends on the intensity and duration of the radioactive influence, and these factors must be taken into account in determining the means of carrying out missions in this situation.

The intensity of the effect is determined by the degree of radioactive contamination of the terrain and by radiation levels, but its duration is a function of the length of time troops are in the contaminated regions. The dimensions of the contaminated territory also have a direct effect on the execution of combat missions by troops and on the whole course of their actions. The area of radioactive contamination of terrain and the levels of radiation compose the fundamentals of a radioactive situation, and therefore they must be taken into account first of all in determining the means of troop operations and solutions to the questions of their control. Both the area of contaminated territory and the levels of radiation in it are a function of quantity and power of the nuclear munitions used by both sides, the type and altitude of the bursts, the time elapsed from the moment of each burst, the speed and direction of the wind, the relief of the terrain and nature of the topsoil, and atmospheric phenomena. For instance, it is known that the area of contaminated territory with dangerous radiation levels two or three hours after a surface burst of one very powerful nuclear warhead comprises tens of thousands of square kilometers. The contaminated zones will be especially widespread in the case of grouped nuclear strikes. In the case of repeated nuclear strikes the dimensions of the contaminated zone may also increase significantly.

This of course does not mean that absolutely all territory in theaters of military activity will be contaminated by radioactive substances from the beginning to the end of the war. In order for that to happen it would be necessary to incessantly initiate endless numbers of only surface and low-level air bursts, and undoubtedly there is no need for either side to do that. Therefore, even if the belligerents make massive use of atomic weapons in the area of troop activity, regions and sometimes even corridors will remain uncontaminated by radioactive particles, and these may be widely used by offensive or defensive groupings of troops.

Radioactive contamination of terrain must not be regarded as something inevitable, although on the whole it will be a constant, regular occurrence. Because of varying significance and location of various targets, and also differences in the power, quantity, and action time of nuclear munitions needed to destroy these targets, the contaminated zones will be formed with different sizes and configurations. Uncontaminated corridors and regions may also have singular outlines and dimensions. Both kinds of zones will constantly be changing shape with the passage of time. Regions uncontaminated at a given time may be subjected to contamination as a result of the belligerents launching subsequent nuclear strikes or if a change in meteorological conditions causes a redistribution of radioactive fallout landing on the earth.

The radiation levels in contaminated zones will also be most diverse and constantly changing. The greater the power of the nuclear warhead and the closer to the center of the burst to ground zero, the higher will be the radiation level. At ground zero itself (immediately after the burst) a very high level of radiation is established, but it drops off sharply in proportion to one's proximity to the borders of the contaminated regions. With the passage of time it is known that a gradual lowering in radiation levels takes place which become ever less dangerous for troops. At the same time a reduction in area of contamination occurs, which continues right up to the disappearance of radiation in given regions.

However, this process always takes a certain amount of time, and its duration is dependent upon the natural rate of decay of the radioactive substances and on meteorological conditions. In addition, dust, sand, or snow moved by the wind, may consequently contaminate new regions. The greatest accumulation of radioactive substances evidently must be expected in low places, ravines, and other inclined terrain which has always been considered good cover and camouflage, and which now may be used in a number of circumstances (until it is contaminated) by troops for protection from nuclear weapons.

It is necessary to distinguish levels of radiation which are dangerous to life, and also harmless and acceptable doses of irradiation (single or multiple exposure). The fact is that troops encountering a contaminated region with what seems harmless radiation levels sometimes will not be able to cross it because they will have already received certain doses of radiation in the conduct of previous operations. Therefore, in planning and conducting operations it is necessary to know, along with other data, the exact radioactive dosage of the troops. But this is possible only with constant control and measurement of their irradiation from the very start of combat operations. Having learned the dosages already received by personnel and the radiation levels in the contaminated regions which must presently be crossed, and also the time needed to conquer them, the total dosages of envisaged radiation may be determined. And if the latter does not exceed the acceptable norms of safety for life, troops may carry out their missions in the given contaminated regions without risking the loss of combat readiness and elimination from action.

The successful conduct of combat operations depends not only on the dimensions of contaminated zones and radiation levels, but also on the nature of terrain after nuclear bursts in these regions, and also on the mobility of forces and their location, which in the course of operations may be extremely varied. In some cases the fields of action and regions of troop distribution may be partly or completely subjected to nuclear strikes, and hence, to radiation injury. In other cases troops encounter in their corridors of movement zones which were contaminated earlier. In still other cases, troops may be overtaken by a radioactive cloud, and so forth. Some units at a given time will be closer to the ground zeros of bursts and others, farther from them.

Thus, the radiation situation in the area of troop operations is characterized by complexity and constant changes occurring within comparatively short intervals. But it always complicates the troops' execution of their mission, and if the essential measures are not taken, may slow down the tempo of advance and cause the loss of personnel and loss of time. This exerts its influence of the conduct of combat operations.

From this it is not difficult to understand that both sides will have to strive not only to take into account, but to also perpetually predict the radiation situation in order to forestall and eliminate its negative effect. Each commander and headquarters obviously, will try to insure that, in spite of the presence of radioactively contaminated terrain, the battle operation is carried out successfully and its final goal achieved in the shortest possible time. Through thorough training of troops and able leadership by them in the course

of combat operations on terrain contaminated by radioactive substances, this is entirely feasible. But for this it is necessary to take an entire complex of measures to protect troops and rear units from defeat, to maintain (and restore) the combat efficiency of regiments and larger units with the aim of securing the possibility of the timely execution of missions assigned to them.

These measures include, most of all, the constant conduct of radiation reconnaissance, the timely notification of troops and rear area elements of the extent of the radioactive cloud and contamination of terrain, and troop security by protective means, special treatment, and other means.

But these protective measures alone, in our opinion are not enough. Besides them corresponding forms and methods of conducting combat operations have to be used, which would eliminate (or at least negate as much as possible) the possibility of radiation harm to personnel. All of this will inevitably facilitate the solution of combat tasks, lessen the possibility of injury to troops by radiation, and consequently allow them to overcome those difficulties which may arise when conducting combat operations under conditions of radioactively contaminated terrain.

Concerning the effect of radioactive contamination of terrain upon the execution by troops of combat missions, we did not, of course, have in mind that the forms and methods of their activities in the course of combat operations change radically. However, under the influence of a radiative situation, in our opinion, changes or refinements in the organization and conduct of combat operations of troops, and also in the activities of commanders and headquarters in control of troops are inevitable.

An analysis of possible conditions of this situation show that such changes are entirely probable in offensive and defensive deployment of troops in position during the transfer of regiments and larger units, i.e. in all types of troop combat activity. This is especially true when solving problems of the application of nuclear weapons in an operation and in combat, and when choosing the axes and determining the operational formation of troops, tempo of operation, etc.

Let us attempt to examine those aspects chiefly connected with the effect of a radiative situation.

For the effective application of nuclear weapons, as is known, exact knowledge is required of the location and position of the objectives to be destroyed. But under conditions of radioactive contamination of terrain, the location of different targets, including those which are advantageous targets for destruction by nuclear

CPYRGHT

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strikes, will be changed considerably more often than when conducting combat operations on uncontaminated terrain for obvious reasons. This undoubtedly complicates the preparation and actual use of nuclear weapons because, under the circumstances, this or that reconnoitered target may be moved to another region within a very short time because of radiation. If this is not taken into consideration, then a planned attack will be carried out upon a deserted place.

Consequently, it is insufficient to confine oneself only to the detection of targets. It is necessary to keep a close watch upon them right up to the delivery of the strikes for their destruction, unless, of course, these strikes for some reason cannot be delivered immediately. More attention must be devoted to the detection of targets in territory not yet contaminated, and to prepare nuclear strikes, taking into consideration a possible change of the position of targets as a result of the formation of new contaminated regions, or for other reasons which may make their transfer advisable. In foreseeing the changes of the radiative situation the necessity arises to determine ahead of time both the primary and alternate targets for the delivery of nuclear strikes; this will save time in the preparation of strikes in case targets are moved.

For the destruction of these targets it is advisable to assign aviation capable of independently establishing their location and immediately delivering nuclear strikes upon them. Regarding the forces and weapons of belligerents entering or already located in areas of contamination, nuclear strikes would hardly be delivered upon them if it is learned that high levels of radiation have already been formed in these areas.

In an offensive and in a head-on engagement the radiative situation must be considered, first of all when selecting corridors for the troop operations. In determining them both sides, undoubtedly, will consider the presence of contaminated zones, their size, configuration, and levels of radiation, and also heavily damaged regions arising from the delivery of nuclear strikes. However, it must be taken into account that in the course of operations, during the time it takes for troops to reach the designated boundaries of pre-selected corridors advantageous for operations, newly contaminated regions dangerous for personnel may have appeared as a result of subsequent nuclear strikes. In such cases it will be necessary to refine or even change the axes of the advance of troops to correspond with the changes in the radiative situation.

In all conditions troop operations in contaminated territory will have a still swifter nature and will be conducted at high tempos with maximum effort of troops and use of armored cars which, as is

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known, in a large measure protect personnel from radiation. Through this, troops carrying out missions will always try to look for corridors with the lowest levels of radiation and least area of contamination. However, for the successful execution of missions at high tempos it will sometimes turn out to be advantageous to use the shortest corridors, even if they have higher levels of radiation, rather than corridors which are longer but have lower radiation levels.

If this is impossible, the aggressors and defenders will try to lead their forces out of the contaminated regions and regions of possible contamination from radioactive clouds as quickly as possible (taking into account that the process of fallout from a radioactive cloud usually begins several hours after the blast). Both the size of the contaminated region and the presence of destruction in it, and the degree of deployment when conducting combat operations will have an effect upon the rate of advance of ground forces as a whole, and for divisions and regiments in particular. It may be supposed that while operating directly on contaminated terrain (possessing access corridors), both sides still try to conduct combat operations in "pre-battle" formations, keeping a large part of their forces in columns, so that if irradiation of personnel higher than the permissible norm is imminent, the troops can be withdrawn from the contaminated region as fast as possible. The deployment of troops into combat formations, and even more so, the dismounting of personnel will take place only in case of extreme necessity. It is especially undesirable during combat operations under conditions of radioactively contaminated terrain.

Essential changes due to radioactive contamination of terrain may occur even in the operational formation of troops. For example, the disposition of elements of this formation (or the first and second echelons, reserves, control points, rear area elements, etc.) is inconceivable without consideration of the presence of contaminated regions. And with the changes in the radiative situation in the course of operations, changes will evidently also take place in the formation of troops, the transfer of its individual wings and sometimes of entire groups.

Even when determining the troop composition of each echelon and their distribution among corridors, it will be necessary to a certain degree to take into account given prognoses and formations of radiative conditions. There is no doubt that it is more advantageous at a given time to use troops who had earlier received the highest doses of radiation in corridors with low levels of radiation or in the composition of the second echelon, which is not marked for immediate combat.

CPYRGHT

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From what has been said it follows that the operational formation of troops in the course of carrying out combat operations under conditions of the radioactive contamination of terrain must, in comparison with the past, be more flexible, allowing for quick changes in the course of the operation in the disposition of forces and fire-power, and the quick shifting of troop effort from one direction to another, and also the timely replacement of units and regiments weakened as a result of nuclear strikes or strong irradiation.

Under these conditions the role and scales of troop maneuver sharply increase. At the same time its execution is again complicated for both the first as well as the second echelons. For example, more time is often needed for the execution of a maneuver, especially when wide zones of contamination with dangerous radiation levels and various types of damage have formed in the path of troop operations, and it is impossible to overcome them on the move.

Evidently, we must consider detouring the troop unit in directions with the least dangerous radiation levels as the primary form of troop maneuver, when there are small contaminated regions arising from isolated nuclear blasts. The replacement of forces which have lost their combat effectiveness by fresh troops, and their withdrawal into uncontaminated areas also is rightfully considered one of these types of maneuvers, inasmuch as this process is connected with the transfer of some troops from the rear to the front, and the transfer of others into a new area.

The situation will be considerably more complex for the troops in corridors where wide zones of contamination with high levels of radiation are being formed. This must be expected most often in the most crucial periods of the operation during the massive use of nuclear weapons, and also when large dispositions of troops are moving out from the rear.

In such a situation, troop operations, in our opinion, will acquire a more mobile nature, and for the carrying out of their missions, contaminated zones will have to be overcome by combined means. A regiment of troops operating in corridors bordering contaminated zones, apparently will try to overcome them on the move without entering into combat, and with subsequent deployment when encountering the enemy. This has been conditioned by the fact that forces of the other side will hardly be found in such zones for long periods of time but will join in battle in front of them or behind them.

The crossing of the zones on the move insures the fast execution of combat missions without lowering the tempo of the offensive. Here, tank units which possess greater protective characteristics in

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comparison with motorized infantry units, are more useful in areas with higher radiation levels, provided, of course, that they do not threaten personnel with radiation dosage exceeding the norm. The possibility has not been excluded that a wide zone may be crossed by an entire troop force advancing in a given direction, especially if the zone has existed for an extended period of time. Even partial decontamination of the terrain may contribute to the crossing of contaminated zones.

But troops often encounter such regions in which the decontamination of terrain and measures for the protection of troops, including protective means taken by them, will only somewhat reduce, but not completely eliminate the possibility of dangerous irradiation of personnel when crossing contaminated terrain.

Troops unable to cross wide zones will, as far as possible, take measures employing mobility in order to go around them, subsequently coming out on their previous headings in accordance with their assigned missions. This will occur most often in those instances when the total dosage of radiation which the troops may receive exceeds permissible norms, when the time for the detour of contaminated zones is small enough to insure the timely execution of missions, and when the terrain allows the troops to advance in quick time.

If it is impossible either to cross or go around a given zone, troop units will be forced to halt and wait for the abatement of the radioactive level. However, it must be taken into consideration that the loss of time involved in waiting for a drop in radiation in many cases will not permit troops to execute their assigned missions in time. Therefore, for the crossing of given zone, it may be advisable to bring in a troop unit of the second echelon or reserves, considering, of course, the dose of irradiation received earlier by these troops. They may also be introduced on borders of the contaminated zone (in adjacent corridors), and subsequently emerge in the previous direction of operations of the first echelon units which were forced to wait out the recession of radiation. In such a case, the latter will evidently be committed to the reserves for some period of time.

For crossing wide zones with high radiation levels it is very profitable to use air transport (airplanes and helicopters). But this will depend entirely upon the timely appearance in operational units of air transport means. Here the first units to be air-transported will, in all probability, be those motorized infantry units and sub-units whose directions of movement contain high radiation levels and great destruction, but whose operations urgently require for their success unceasing advance in a given direction, or directions.